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SOME INDIAN FOOD PLANTS.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

1. SHEPHERDIA ARGENTEA, NUTTALL.

By Henry Trimble.

Read at the Pharmaceutical Meeting, November 20th.

In September of this year I was furnished with some fruit of the above plant by Dr. V. Havard, United States Army Surgeon at Fort Abraham Lincoln, Dakota, who also forwarded the following description: "Shepherdia argentea, *Nuttall*, (Buffalo berry, Bullberry, the *grains de bœuf* of the Canadians) of the order *Eleagnaceæ*. Branching, spiny shrub generally 5 to 8 feet high but in favorable localities, along streams, becoming arborescent with a stem six inches in diameter and reaching an altitude of 16 or more feet. Rare east of the Missouri River, abundant on this river and thence extending westward to the Sierra Nevada, being common in Oregon, Nevada and Utah. From the Saskatchewan in the British Possessions, it extends southward through Montana, Wyoming and Colorada to New Mexico. Its most congenial habitat is probably the upper Missouri and tributaries through Nebraska, Dakota and Montana. Sometimes it lines the banks of this river for miles together, forming impassable hedges. The leaves are opposite, entire, mostly oblong, 1 to 2 inches long, silvery on both sides and slightly dotted with ferruginous scales; the bluish white foliage contrasting singularly with that of other shrubs. The flowers are dicœcious; the male bushes becoming covered with a profusion of small yellow blossoms in April; these have a four-parted perianth and eight stamens alternating with

as many lobes of a thick disk. The female bushes put out their inconspicuous flowers one or two weeks later. The fruit is a red, pellucid berry, three lines in diameter, with a smooth, shining seed; it begins to turn scarlet in July, but is not edible before September, and remains on the bushes until shrivelled by frost.

"The berries grow in such profusion as to cover the stems and twigs to which they are attached by a very short stalk, contrasting charmingly with the silvery foliage, the whole shrub, at this time, being highly ornamental. They are very acid, and hardly palatable until they have been touched by one or two frosts in the early days of October, when they are sweetened and acquire a very pleasant flavor, unlike that of any other fruit.

"Until recently, they constituted one of the staple foods of the Indians, the Utes of Utah, as well as the Sioux of Dakota, or the Blackfeet of the Saskatchewan, who consumed them raw and stewed, or mixed with other native esculents. They still eat enormous quantities of them. The whites are likewise fond of these berries, but use them mostly in the making of an excellent jelly, which is to be found in every household along the Upper Missouri and Yellowstone.

"This jelly has an excellent acidulous flavor *sui generis*. Berries and jelly are very wholesome, and can be freely eaten without the least inconvenience or discomfort.

"Besides being an ornamental shrub of great value the Buffalo berry, with its diffused thorny branches, makes also an excellent hedge plant. It is hardy, stands transportation with great immunity, grows rapidly during the first few years, and is susceptible of any shape by pruning, so that, if female plants only be used, a hedge is obtained of great beauty, strength and durability."

These berries have been mentioned by Dr. Edward Palmer,[1] and by Dr. J. S. Newberry,[2] but no analysis has been found, and it was thought that a determination of the more important constituents of the fruit might be of interest, particularly for comparison with currants, which they resemble very much. As the composition varies with the ripeness of the fruit, it may be noted that in this sample the berries had become ripe, although they had not been touched by frost, and were therefore quite acid.

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[1] Plants used by the Indians of the United States.—*Amer. Jour. Phar.*, 1878, page 543.

[2] *Popular Science Monthly*, xxxii., page 45.

Petroleum ether extracted from the nearly dry berries a small quantity of fat, with a considerable amount of red coloring matter, which color was further almost completely extracted by ether and alcohol, the latter solvent taking out some acid. As the fat, doubtless, comes from the seeds, it probably exerts but little influence on the value of the berries as a food. The acidity was found to be due to citric and malic acids. The amount of acid was estimated by expressing 10 grams of the fruit, and neutralizing the juice with normal sodium hydrate solution. Whether calculated for citric or malic acid, the results would differ very slightly, so the percentage as malic acid was found to be 2·45.

Moisture and ash were determined in the usual way, and found to be for the former, 71·28 per cent., and the latter, ·45 per cent. Nitrogen was determined by combustion with soda lime, which indicated ·14 per cent. of albumenoids.

Sugar was determined, both before and after boiling with acid, by the gravimetric method with Fehling's solution, and there was found 2·45 per cent. cane sugar and 3·02 per cent. grape sugar.

The aqueous solution of the berries precipitated by alcohol indicated ·42 per cent. mucilage and pectin.

A pleasant acidulous jelly was also made which, in almost every particular, resembled that from currants.

A comparison of the following results with the constituents of currants, as given by Blythe (Composition and Analysis of Foods, page 133), may be of interest:

	Buffalo Berries.	Currants.
Water	71·28	84·77
Nitrogenous Substances	·14	0·51
Free Acid	2·45	2·15
Total Sugar	5·47	6·38
Other Non-nitrogenous substances (Pectin, etc.)	·42	0·90
Undetermined	19·79	4·57
Ash	·45	0·72
	100·00	100·00

Treatment of Warts.—Children often suffer from unsightly warts on the hands, which cannot be removed by caustic. G. B. Pullin, of Sidmouth (*Bristol Medical Journal*), recommends in such cases the administration of two or three minims of liq. arsenicalis twice a day. In a week or ten days, he says, the warts will disappear.

POTATO STARCH AND OTHER STARCHES OF COMMERCE.

By William A. S. Johnson, Ph. G.

From an Inaugural Essay.

The manufacture of potato starch being an important industry on Prince Edward Island, I visited one of the largest of the factories, situated about fifteen miles from Charlottetown. As is usually the case, it is built on the banks of a stream where a constant supply of clean water is always at hand. The establishment is capable of turning out about eight tons of starch daily, but is worked only for a few months in the autumn when new potatoes can be procured.

There are now ten factories on the island capable of making about 2500 tons of starch during the season, which is largely shipped to England and the United States, where it is principally used in the arts. When desired for use as an article of diet, it is preferable when about a year old, as it is then harder.

The potatoes, after being weighed, are dumped into a cellar which is connected by means of a shoot with a revolving cylinder having a stream of water running through it. The bottom of this shoot, instead of being solid, consists of a number of small iron rods placed longitudinally, and about an inch apart, which allows the dirt, etc., to fall through. From the cylinder, the potatoes fall into a long inclined trough, full of water, which has beaters or paddles revolving in it. The last two of these are broad and flat, and after the potatoes have gone the full length of the trough and have been thoroughly washed, they are thrown by the flat paddles into a box having a cylinder about six feet long, and twenty-two inches in diameter, covered with iron like a nutmeg grater, and turning at the rate of 700 revolutions a minute. This grates the potatoes, making them into a pulp which is washed by a stream of water on to long sieves made of number 70 brass wire which are kept in rapid motion. Over these is placed a long box with a bottom of zinc having three longitudinal lines of perforations, through which steady streams of water pour on the sieves washing all the starch through, while the fibre, etc., is shaken off and washed away. The starch water is carried into a series of tanks about 10 x 12 feet, and 6 feet deep where it is allowed to settle, which takes from seven to eight hours. The water is then drawn off and the tanks are filled again. After the starch has all settled and the water run off

a second time, the combined contents of the several tanks are shovelled into a larger one which is about 28 x 15 feet, and 6 feet deep. This is then filled with clean water, and by means of a large beater, the starch is stirred up and suspended in the liquid, giving it the appearance of milk, which is then pumped into tanks 24 x 12 feet, and about 5 feet deep, where it is again allowed to settle, taking about 15 hours. After the water has been drawn off, there is generally a superficial layer of about two inches consisting of fibre, dirt, etc., which is shovelled out, and thrown into a tank to go through the process again, while the clear starch is thrown into a mill and ground to a fine powder, which is then put upon racks to dry. These drying racks consist of a number of layers (about 16) of narrow strips of wood about an inch wide, which are arranged in such a way that the starch in falling through is distributed equally over them. They are kept at a temperature of about 120° Fahr. by means of steam, and it takes about 20 hours to dry eight tons. When perfectly dry, the racks are tipped, and the starch falls into bags placed in suitable positions.

A sample of the starch thus prepared, was examined, and the result of my investigations is given in the table below.

Six samples of starch were purchased in Philadelphia, and a qualitative examination was made for the purpose of comparing them. They fairly represent the commercial starch, being of various qualities, and bought in different sections of the city.

	Ash.	Moisture.	Soluble Matter.	Reaction.	Variety of Starch.
1	.275 per cent.	15.225 per cent.	.200 per cent.	Neutral.	Potato.
2	.452 per cent.	13.347 per cent.	.380 per cent.	Neutral.	Corn.
3	.439 per cent.	10.907 per cent.	.560 per cent.	Neutral.	Corn.
4	.641 per cent.	11.413 per cent.	.560 per cent.	Alkaline.	Corn.
5	.060 per cent.	12.452 per cent.	.200 per cent.	Alkaline.	Wheat.
6	.553 per cent.	.....	.....	.....	Corn.
7	.386 per cent.	.....	.....	.....	Corn.

The ash in each case was found to be soluble in HCl, with the exception of a slight residue, probably silicates incorporated during the washing process. On neutralizing this solution with NH_4OH, and adding NH_4HS, a black precipitate was formed in all the samples except No. 6, due to a trace of iron. No copper was found in any of the specimens.

The quantity of moisture varied, the potato starch (No. 1) contain-

ing most (15·225 per cent.), while No. 3 contained least (10·907 per cent.). The last two samples were not dried, but just the amount of ash ascertained.

On agitating 5 grms. of the starch with 100 cc. of distilled water, filtering and evaporating the filtrate to dryness, the amount of soluble matter was found to vary from 0·200 per cent. to 0·560 per cent. On redissolving this in distilled water, no reaction was given with Fehling's solution, nor was any change noticed after boiling with HCl, neutralizing with NH_4OH, and adding Fehling's solution. However, when treated with iodine, all gave the blue color, with the exception of No. 4. No ammonia odor was evolved on heating with strong NaOH solution, indicating absence of nitrogenous matter.

Distilled water agitated with the starch, then filtered, gave a neutral reaction to test paper, except Nos. 4 and 5, which were very slightly alkaline.

On boiling with water the order of transparency of the jelly was 1, 2, 4, 3, 5, No. 1 being perfectly clear, the others following in the order given, Nos. 3 and 5 having a faint blue tint.

On examination under the microscope, No. 5 was found to be wheat starch, the rest being corn starch, with, of course, the exception of No. 1, which was known to be from the potato.

ON IRIS TEST PAPER.

By Wm. G. Greenawalt, Ph. G.

Read at the Pharmaceutical Meeting, November 20th.

Last spring, while arranging some of our common blue flags for a floral display, I was attracted by their deep purplish blue color and conceived the idea that the coloring matter might be utilized for some good purpose. After a little thought upon the subject, I decided to try the effect of acids and alkalies upon it, when, as I had anticipated, the former produced a magenta red color, but to my surprise the latter gave a green color. I then prepared a strong infusion of the petals in hot water, filtered it, and evaporated to concentrate the solution. In this I dipped pieces of unsized white paper which were colored blue, the purplish hue being overcome presumably by the strength of the solution, and I found by experimenting that I had a very good test paper for acids and alkalies.

It is quite sensitive to the mineral acids even in dilute solutions, but I found it necessary to have rather strong solutions of the vegetable acids (acetic acid excepted) in order to get the color reaction. With the alkalies I experienced no trouble as it invariably turned green.

In order to form an approximate idea as to the strength of the solution necessary to make a good test paper, I procured a quantity of the flowers (which was necessarily small owing to the lateness of the season), took the purple parts of fifteen flowers, which weighed 450 grains, added two ounces of hot water, allowed it to stand ten minutes; then filtered it and evaporated to one-half ounce. This I found sufficiently strong for a good test paper.

On preparing red and green paper in the same manner as litmus paper is prepared, I found that the color is not permanent, but, in the course of a few days, changed back again to the original blue. Another strange feature I noticed, upon drying a portion of the flowers to ascertain the amount of moisture present, that the colored portion upon being thoroughly dried changed to a brown and therefore did not answer for testing. This shows that only fresh flowers could be used.

It is not likely that this coloring matter will ever answer for general use as well as litmus; but it would be interesting to know whether it might not be used in some cases where litmus would not answer the same purpose.

NOTE ON THE BLUE COLORING MATTER OF FLOWERS.

By the Editor.

Read at the Pharmaceutical Meeting, November 20th.

Mr. Greenawalt's observations with the flowers of Iris versicolor, recorded in the preceding paper, show that the coloring matter of these flowers agrees in behavior with that of other blue flowers. The principles to which flowers owe their characteristic colors do not appear to have been the subject of recent researches, and the results obtained by older investigations have been more or less forgotten, and are not referred to in many chemical text-books in which some information on such an interesting subject would naturally be sought for;

even Fownes' Manual is entirely silent on the coloring matter of flowers, carmin and carthamin excepted, though a number of other vegetable coloring matters have been described. The cause for this disregard is evidently to be looked for in the unsatisfactory results thus far obtained, and these are very easily explained by the difficulties surrounding an investigation of substances, which are apparently not crystallizable, and are known to be very readily altered under the influence of various physical and chemical agencies. It may, therefore, be of interest to give a brief summary of what is known concerning the nature of the blue coloring matter of flowers.

The influence of woodash and similar alkaline substances upon certain vegetable colors was known at an early period; but these characteristic reactions were first studied by Robert Boyle (1627-1691), who was "the first chemist, whose investigations in chemistry emanated solely from the noble impulse to explore nature."[1] He observed that the alkalies change the blue vegetable colors to green, several red ones to purple, the yellow colors to red, and that the vegetable colors altered by acids are restored by the alkalies.[2]

Since that time, and more particularly during the past, and the early part of the present century, the coloring matter of blue flowers has been frequently used as a reagent for alkalies and acids, until it has been entirely supplanted by litmus, turmeric and several artificial coloring matters. Thus we find, for instance, in "Cooley's Cyclopedia of Practical Receipts," under the heading *Paper, Test*, directions for the preparation of test papers, and among other varieties the following in which the blue coloring matter of flowers and fruits is utilized:

Dahlia Paper; Georgina Paper.—From an infusion of the petals of the violet dahlia (*Georgina purpurea*), alkalies turn it green; acids red; strong alkalies turn it yellow. Very delicate.

Elderberry Paper.—From the juice of the berries, as the last.

Mallow Paper.—From an infusion of the purple flowers of the common mallow; affected like dahlia paper.

In some localities the flowers of the blue violet were employed as a reagent, and a permanent solution of the coloring matter, adapted for the purpose indicated, was recommended in 1810 by Descroizilles,[3] to be

[1] Kopp, Geschichte der Chemie I, 163.
[2] Ibid. III, p. 27.
[3] Trommsdorff, *Jour. der Phar.* xvii, 2, p. 304.

prepared by making an infusion of one part of violet petals with two parts of boiling water, and dissolving in the clear liquid one-third its weight of table salt; if kept in small well-corked vials, this solution is stated to remain unaltered in the sunlight. The blue flowers of the larkspur (Delphinium), and of the columbine (Aquilegia), treated in a similar manner, can also be used as chemical reagents.

Regarding the chemistry of the blue coloring matter, the principal investigations, embracing blue flowers of different orders, were published by Marquardt in 1835, and by Frémy and Cloëz in 1854, in addition to which a large number of observations on the coloring matter of certain flowers might be mentioned. Marquardt named the blue coloring matter *anthocyan*, the *cyanin* of Frémy and Cloëz, the latter name having been more recently appropriated for a blue dyestuff derived from chinoline. The chemists named regard the coloring principles of all blue flowers as identical, the blue compound being amorphous, soluble in water and alcohol, but insoluble in absolute alchohol, ether, volatile oils, etc. Its solution is sometimes rapidly decolorized on exposure, also by reducing agents; it is colored red by acids, and green by alkalies, and yields with lead acetate a green precipitate. The coloring matter of red flowers is regarded as antho-cyan (cyanin) colored red by acids. Even white flowers often contain the same coloring matter, and hence are colored green by alkalies. The coloring matter of various berries is changed to green by alkalies, and to red by acids, and has been regarded as identical with that of blue flowers, but derivatives of quercitrin and rutin are likewise known, having similar reactions.

However, a large number of investigations have been made on red, purple and blue berries, proving that in many instances their coloring matters show decided differences in behavior. Similar observations have also been made with many red and purple flowers, which contain red coloring matters not agreeing with anthocyan in reactions. But the blue flowers examined by many chemists show in so far identical reactions, as they are turned red by acids, and green by alkalies. Some minor differences in behavior have been ascribed by Filhol (1860) to the presence of sugar and other compounds.

The identity of the blue coloring matters of different flowers has

as yet not been proven, and it is not improbable that a number of different compounds may ultimately be isolated, having similar, yet not identical properties; in other words, that the coloring matters of flowers differ to a greater extent than the earlier investigations seemed to indicate.

ANALYSIS OF COMMERCIAL SODIUM BICARBONATE.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

By Hermann M. J. Schroeter, Ph. G.

Read at the Pharmaceutical Meeting, November 20th.

The Pharmacopœia directs two kinds of bicarbonate of sodium: "Sodii bicarbonas" and "Sodii bicarbonas venalis." The commercial article as produced now on a large scale and found in the market is believed to be quite pure and is used very extensively. If the commercial product is found to be sufficiently pure to be used for most purposes, it would obviate the direction of two kinds by the Pharmacopœia. It is also believed that the commercial article is in most cases used by the pharmacist and by some exclusively. The object of this analysis is to show the difference existing between the commercial and the chemically pure article as now obtainable in the market. Whether any of the commercial products respond to the requirements of the pure, will be shown; and also whether the commercial kind is sufficiently pure for most purposes.

The commercial bicarbonate is prepared on a large scale among other processes by saturating sodium carbonate with carbon dioxide. The excess of normal salt is then washed out with water, the acid salt being much less soluble in water. Accordingly the commercial product contains always a certain amount of the normal salt. It is also stated that a small amount of carbonate, at least 1 per cent. is unavoidably present in every bicarbonate; this is due to the loss of some CO_2 on drying the salt and by age. By repeated washing of the commercial product, all of the normal salt is eliminated, besides some impurities, as chlorides and sulphates; but on drying even without application of heat, by moistening the washed salt with alcohol and then drying between folds of filter paper, it undergoes partial decomposition and contains about 1 per cent. of normal carbonate.

The following analysis consists of an investigation of 16 brands of

bicarbonate of sodium, 15 of which are commercial products and one was marked chemically pure. The samples were procured from different sources, constituting the most universally known brands. Nos. 1 to 8 inclusive, are of American manufacture, No. 8 being the C. P.; Nos. 9 to 14 inclusive are English, and Nos. 15 and 16 are French products.

The requirements of the Pharmacopœia were executed with each sample, and compared to classify them.

None of the samples on agitation with water left an insoluble residue. It is stated that the salt on continued heating loses moisture and carbon dioxide, amounting to about 37 per cent. by weight. This percentage will, of course, vary with the moisture present, and also the amount of total $NaHCO_3$. While estimating with each sample, as will be shown later, the total loss on ignition was noted, and is as follows:

No. (1), 36·36 per cent.; (2), 36·33 per cent.; (3), 35·76 per cent.; (4), 36·12 per cent.; (5), 36·66 per cent.; (6), 36·28 per cent.; (7), 36·30 per cent.; (8), 36·78 per cent.; (9,) 36· per cent.; (10), 36·80 per cent.; (11), 36·65 per cent.; (12), 36·40 per cent.; (13), 36·54 per cent.; (14), 35·78 per cent.; (15), 36·09 per cent.; (16), 36·33 per cent.

For the detection of chlorides, a 1 per cent. aqueous solution of the salt was supersaturated with HNO_3, and then $AgNO_3$ added. Only a slight opalescence was produced, and with most of them hardly perceptible. For sulphates another portion was similarly tested with $BaCl_2$, showing but traces present in most cases. On heating a small portion with sodium hydrate, two samples, Nos. 5 and 10, gave evidence of ammonia, the others were free from same. No. 5 was manufactured by the Solvay or ammonia-soda process, and No. 10 was of English manufacture, and probably by the same process.

For the limit carbonate the following test was applied as directed: 2 gms. of the salt were dissolved in 30 cc. of cold water, and then added to a 5 per cent. aqueous solution of mercuric chloride. In the absence of more than about 3 per cent. of carbonate a white cloud should form only, but neither a red precipitate nor a red color should make its appearance within 3 minutes. According to this reaction, Nos. 1, 2, 7, 8, 9, 11, 13 and 16, gave either no precipitate, or only a white cloud. Nos. 3, 4, 6, 12, 14 and 15 gave either a light red color or a precipitate. Nos. 5 and 10 gave a decided white precipitate, but

no color. This precipitate was found to be due to the presence of ammonia in these two samples. With a saturated aqueous solution of magnesium sulphate no precipitate was formed with any of the samples, indicating less than the limit of carbonate for the commercial variety.

The volumetric methods for the estimation of total bicarbonate were next experimented with. For the pure sodium bicarbonate the Pharmacopœia directs that 4·2 gms. of the salt should require not less than 49·5 cc. of the vol. sol. of oxalic acid for neutralization, corresponding to at least 99 per cent. of $NaHCO_3$. For the commercial variety, 4·2 gms. of the salt should require not less than 47·5 cc. of the vol. sol. of oxalic acid for neutralization, corresponding to at least 95 per cent. of $NaHCO_3$. It must be stated here, that this method of estimating the salt will not give correct results when it contains normal carbonate, for in that case the percentage of $NaHCO_3$ will be indicated too high and in some cases be above 100, according to the amount of Na_2CO_3 present. As will be seen by the following results, the volumetric method as directed in the Pharmacopœia for the estimation of total acid carbonate is incorrect and cannot be used to obtain accurate results. In executing this estimation an excess of noted volume of standard oxalic acid solution was first added. The CO_2 was expelled by boiling and then triturated by standard soda solution. The percentages given below are the equivalents of $NaHCO_3$, according to the above method, but go to show the inaccuracy of same.

No. (1), 100·17 per cent.; (2), 99·73 per cent.; (3), 99·53 per cent.; (4), 100·73 per cent.; (5), 101·19 per cent.; (6), 99·94 per cent.; (7), 99·63 per cent.; (8), 100·20 per cent.; (9), 99·71 per cent.; (10), 102·38 per cent.; (11), 100·83 per cent.; (12), 99·72 per cent.; (13), 99·66 per cent.; (14), 101·03 per cent.: (15), 102·37 per cent.; (16), 103·48 per cent.

After completing these preliminary tests and estimations it was thought advisable to make complete quantitative analyses of all the samples. On referring to numerous authorities for a method of estimating the normal carbonate in the bicarbonate, none could be found. The following method, however, was devised and used to estimate the moisture and the normal carbonate present. In a combustion tube connected with absorbing apparatus for H_2O and CO_2, a weighed quantity of the salt was heated for about half hour. Sodium

bicarbonate is decomposed by heat into the normal carbonate, carbon dioxide and water. One hundred parts of $NaHCO_3$ will yield 63·095 p. Na_2CO_3, 10·714 p. H_2O and 26·191 p. CO_2. Knowing the amount of CO_2 produced by 100 parts of $NaHCO_3$, the corresponding percentage of total $NaHCO_3$ in the sample can be calculated from the weighed products obtained by ignition in the combustion tube. The total CO_2 present in the sample was also estimated by decomposition with an acid and noting the loss. The difference between this total CO_2 and the CO_2 necessary for the $NaHCO_3$ present in the sample, would indicate the amount of CO_2 in combination as normal carbonate, in which form it can easily be calculated. In similar manner the amount of moisture was obtained. Knowing the theoretical quantity of H_2O produced from 100 parts of bicarbonate on decomposition by heat, the amount which would be formed from the percentage of $NaHCO_3$ present can then be calculated. The difference between this amount and the total amount of H_2O weighed on decomposition, represents the moisture.

The ammonia in Nos. 5 and 10 was estimated by the following method :—

An aqueous solution of a weighed quantity of the salt was boiled for some time with solution of soda. The NH_3 liberated was conducted into a flask containing 50 cc. of one-tenth normal oxalic acid solution. The absence of any sodium hydrate carried over during the process was verified by the flame test. The excess of oxalic acid was then triturated with soda solution of same strength. The results obtained were 0·217 per cent. and 0·366 per cent. of NH_3 for Nos. 5 and 10 respectively.

The amount of chlorides and sulphates was estimated in usual manner by precipitation with $BaCl_2$ and $AgNO_3$, and weighing as $BaSO_4$ and AgCl.

The following table gives complete analysis of each sample :—

$NaHCO_3$	95·68	96·30	92·69	94·92	95·19	94·43	94·92	97·44	95·72	94·43	95·65	94·59	96·41	94·28	92·44	94·85
Na_2CO_3*	2·45	2·10	4·50	3·52	2·00	3·58	2·99	1·88	2·98	2·57	2·95	3·79	2·37	4·25	4·91	3·15
NaCl	0·50	0·34	0·60	0·16	0·19	0·04	0·51	0·12	0·33	0·14	0·17	0·05	0·20	0·30	0·02	0·04
Na_2SO_4	0·40	0·38	0·54	0·07	0·05	0·67	0·22	0·05	0·12	0·02	0·01	0·03	0·02	0·13	0·55	0·57
NH_4HCO_3 ..	.....	.....	.....	.....	1·00	.....	.....	.....	.....	1·70	.....	.....	.....	.....	.....	.....
Moisture.....	0·89	0·83	1·57	1·27	1·55	1·24	1·26	0·47	0·77	1·07	1·13	1·48	0·92	0·99	2·00	1·39
	99·92	99·95	99·90	99·94	99·98	99·96	99·90	99·96	99·92	99·93	99·91	99·94	99·92	99·95	99·92	99·94

The above results would indicate an average of 3.21 per cent. of normal carbonate in the commercial product. The Pharmacopœia allows for the commercial bicarbonate about 5 per cent. of carbonate, and for the pure a limit of 3 per cent. Accordingly the commercial product is almost equal to the requirements of the pure, and the majority of the samples responded to same, showing the superiority of the commercial product now in the market.

ANALYTICAL NOTES.

Abstracts from Theses.

Assay of Benzoin.—Thos. F. Moody, Ph.G., assayed ten commercial samples of benzoin, by digesting and afterward boiling in each case 20 grams with 10 gm. of slaked lime and 200 gm. of distilled water; the decoction was filtered, the residue well washed with hot water, the filtrate cooled and acidulated with hydrochloric acid. The precipitate was collected on a filter, washed with cold water, the filtrate agitated with chloroform, the chloroform solution evaporated and the residue added to the contents on the filter. After drying, the benzoic acid thus obtained was weighed, amounting for the samples examined to 2·14, 3·20, 3·40, 3·55, 4·0, 5·02, 5·50, 9·05, 9·72, and 10·45 per cent. In each case the presence of cinnamic acid was shown by the bitter almond odor produced on treatment with potassium permanganate. The author also states that he observed the white tears to yield a much smaller amount of benzoic acid than the brown mass, but analytical figures are not given.

Guaiac Resin.—John Herman Rabenau, Ph.G., examined four commercial specimens with the following results:

	Nos. 1.	2.	3.	4.
Soluble in petroleum benzin	·006 per cent.	·002 per cent.	·01 per cent.	
Soluble in ether	52·8 "	73·9 "	66·9 "	49· per cent.
Treatment of ether extract with KHO, then HCl; precipitate weighed	29·4 "	54·7 "	28·1 "	30·7 "
Portion insoluble in ether, soluble in alcohol	9·9 "	6 1 "	12·2 "	completely.
Ash from original resin,	6·45 "	4·75 "	9·75 "	trace.

Extractum Glycyrrhizæ.—Four commercial samples of liquorice, of American manufacture, except No. 2, were examined by Wm. C. Müntzer, Ph. G. The moisture present was not determined. The water solution, treated with sulphuric acid, yielded crude glycyrrhizin, which was rendered pure by dissolving in ammonia and reprecipitating by acid. The portion insoluble in water was treated with ammonia, and this solution with sulphuric acid, when crude glycyrrhizin was obtained and purified as before.

	Cold distilled water.		Soluble portion, Glycyrrhizin.		Insoluble portion, Glycyrrhizin.		Total pure Glycyrrhizin.
	Insoluble	Soluble.	Crude.	Pure.	Crude.	Pure.	
1.....	27·70	72.30	11.65	8·70	1·47	1·04	9·74
2.....	26·86	73·14	4·18	2.57	5·35	4·20	6·77
4.....	24·15	75·85	6·93	5·95	1·54	1·10	7·05
3.....	47·29	52·71	7·40	2·64	2·03	1·50	4·14

Solubility in water not being a reliable indication for the purity of liquorice, the author suggests the following process of assay: Macerate for two hours in a flask 10 gm, of the extract, in coarse powder, with 190 gm. of distilled water and 10 gm. ammonia water; allow to settle; pour the liquid upon a filter; rinse the flask and filter with about 100 cc., used in several portions, of the same menstruum, until the washings are no longer colored brown, acidulate the filtrate with dilute sulphuric acid; allow to stand for one hour; filter; wash the precipitate with distilled water; redissolve in 5 per cent. water of ammonia; precipitate with sulphuric acid; after one hour filter; wash with distilled water until the washings produce no cloudiness with barium chloride; dry the precipitate at 100° C., and weigh. The weight multiplied by 10 gives the percentage of glycyrrhizin contained in the extract.[1]

Isinglass.—Robert Baird, Ph. G., examined the following commercial samples: Nos. 1, 2 and 3, Russian isinglass; Nos. 4 and

[1] The exact solubility of glycyrrhizin in water of different temperatures, and in dilute acids of different strength, has not yet been determined.—Editor.

5, American isinglass; No. 6, French gelatin, gold label; No. 7, French gelatin, bronze label; No. 8, Cooper's gelatin.

No.	1	2	3	4	5	6	7	8
Ash	0.4	0.643	0.527	2.407	2.17	1.14	2.66	4.775
Moisture	12.1	12.8	12.5	13.0	12.3	12.8	13.4	13.0
Insoluble in hot water	6.0	5.2	5.5	10.0	18.5	Completely soluble.		
Jelly with 24 parts of hot water	None.	Slightly opalescent.	None.	Opal-escent.	None.	Transparent.		
Parts of water for jelly	18	24	21	24	19	24	24	24

Commercial oxide of zinc was examined by William F. Hebsacker, Ph. G., and compared with a sample prepared by himself (No. 1). The results tabulated were as follows:

Sample.	Effervescence with acids.	Solution treated with excess of ammon. carb.	Acid solution treated with H_2S.
1	None.	Perfect solution.	No effect.
2	None.	Slight precipitate.	No effect.
3	Slight.	Perfect solution.	Slight precipitate.
4	Slight.	Slight precipitate.	No effect.
5	Slight.	Slight precipitate.	No effect.
6	Strong.	Slight precipitate.	No effect.
7	None.	Slight precipitate.	Slight precipitate.
8	Strong.	Perfect solution.	No effect.
9	Slight.	Slight precipitate.	No effect.
10	Slight.	Perfect solution.	Slight precipitate.

PHARMACEUTICAL NOTES.

Abstracts from Theses.

Abstractum Rhamni Purshianæ is a new preparation. Made into compressed pills it is one of the most agreeable forms for administering this drug, without the unpleasant taste, which is difficult to disguise. The dose is from three to fifteen grains. Harry Lippen, Ph. G., gives the following process for making this abstract:

Mix alcohol 15 fluidounces with water 1 fluidounce, and moisten with 2 fluidounces of the menstruum four ounces of the bark in No. 60 powder, pack in a percolator, and by maceration and displacement exhaust the powder, reserving the first 3½ fluidounces of the percolate. Distill off the alcohol from the remainder, mix the residue with the reserved portion, place the mixture in an evaporating

dish, and having added one ounce of milk sugar, set aside in a warm place to dry; then add enough milk sugar to make the mixture weigh two ounces, reduce to a fine uniform powder, and keep it in a well-stopped bottle.

Fluid Extract of Staphisagria.—J. Walton Travis, Ph. G., experimented on stavesacre seeds with menstruums of different alcoholic strength, containing to one part of water, respectively, eight, three, two and one part of alcohol. The fluid extracts prepared with these liquids contained the fixed oil of the seed, which could be separated by means of a separating funnel after keeping the fluid extract for some time at a temperature of 40°F. The ground seeds were then exhausted with petroleum benzin to which they yielded 24 per cent. of fixed oil, which was not further examined; the powder, thus exhausted, was used for the preparation, by the pharmacopœial method, of a fluid extract, the menstruum consisting of two parts of alcohol and one of water. The preparation was of handsome appearance, and upon standing for several months contained no precipitate.

Preparations of Calendula.—Frank G. Mumma, Ph. G., suggests as an antiseptic dressing

Calendulized lint.—Calendula in coarse powder, 12 parts, is percolated with dilute alcohol until 82 parts of tincture are obtained; add to this 6 parts of glycerin, saturate with the mixture 1 part of lint, and expose to the air until the alcohol and water have evaporated.

Tincture of Calendula, prepared with diluted alcohol, from either the leaves or the flowers does not differ much in color or taste, but that of the flowers is more aromatic. When, however, strong alcohol is used, the flowers yield a golden yellow, and the leaves a dark green tincture, the latter being also very unlike the former both in taste and odor.

Glycerite of Calendula.—Moisten half a troy ounce of calendula, in coarse powder, with a menstruum composed of 3 measures of alcohol, one of water and two of glycerin; then percolate to obtain 3 fluidounces of tincture; by means of a gentle heat evaporate the alcohol and water, add enough glycerin to make 3 fluidounces, heat for a few minutes and strain through fine muslin. It is not perfectly transparent. A glycerite of the leaves is very unlike that of the flowers.

Healing oil.—Ira L. Bond, Ph. G., states that this name is given near Tamaqua, Pennsylvania, to a mixture composed of fluid extract of calendula, 30 parts, and olive oil, 70 parts. It has been extensively

used, and with good results, as a healing application to incised and lacerated wounds.

Preparations of Pycnanthemum linifolium, Pursh.—Howard T. Painter, Ph. G., found the fresh herb to lose on drying from 50 to 60 per cent. of weight, and the air-dry herb to yield 6 to 7 per cent. of ash. The herb is known in some localities as *dysentery weed* and is used for dyspepsia and in bowel complaints, and in hot infusion as a diaphoretic. The following preparations are suggested:

Fluid extract of pycnanthemum.—The menstruum used is a mixture of alcohol 1 part and water 3 parts. The fluid extract is of a deep red brown color, has the characteristic odor and taste of the drug, and on standing for some weeks deposits a slight precipitate. The addition of 5 per cent. of glycerin to the menstruum does not prevent the precipitate.

Syrup of pycnanthemum, prepared from the fluid extract 25 parts, and simple syrup 75 parts, affords a pleasant form for administration.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph. G.

Antiseptic Pastilles, for use in diphtheria, are made by incorporating boric acid and borax, each 20 gm., citric acid 12·5 gm., sodium benzoate 1 gm., oil of lemon 1·5 gm., oil of thyme 1 gm., oil of peppermint 0·5 gm., with glycerin and water as solvents, and gum, sugar and gelatin as basis, and dividing into 500 pastilles.—*Schmidt's Jahrbuch, Pharm. Centralhalle*, 1888, 501.

Helleborein, the glucoside of Helleborus niger and Helleborus viride, has been used as a substitute for digitalis. Victorio and Ehridia have discovered that it is an efficient local anæsthetic; when used in one per cent. aqueous solution, three or four drops placed in the eye of a dog or rabbit produce anæsthesia of the cornea, lasting about 30 minutes, without producing disagreeable secondary effects.—*Apoth. Ztg.*, 1888, 793.

Oleum Theobromæ has been re-investigated by Paul Graf, who finds it to contain small quantities of free fatty acids and cholesterin. The liberated fatty acids on distillation gave evidence of formic, acetic and butyric acids; oleic acid is present, and after its separation, arachic, stearic and lauric acids were isolated by fractional precipitations with

magnesium and barium acetates. The determinations of glycerin gave as a mean 9·59 per cent. Melting-point determinations, made in an open tube, gave for specimens of various sources figures varying from 29·4 to 33·4° C., while those made in a closed tube gave, with one exception, a uniform melting point at 34·3°.—*Arch. der Pharm.*, 1888, 830.

Detection of Colophonium.—A solution of this in glacial acetic acid, on addition of a drop of concentrated sulphuric acid, assumes an intense red to blue-violet color, soon changing to yellowish-brown, having decided fluorescence. In the examination of soaps, the separated fatty acids are dissolved in glacial acetic acid by application of heat, allowed to cool, and then the sulphuric acid (sp., gr. 1·53) added. Serviceable for the detection of rosin in bees'-wax.—Th. Morawski, *Chem. Rpt.*, 1888, 270.

Nitrous acid in water, in quantities not detected by diphenylamine, is indicated on addition of hydriodic acid by the liberation of iodine after standing a short time.—*W. Kalmann, Chem. Rpt.*, 1888, 269.

Eseridine an alkaloid of the Calabar bean and closely related to physostigmine is convertible into the latter by warming with dilute acids, consequently its solutions in dilute acid should always be made in the cold. Its action on the system is to cause certain diarrhœa with little or no action on the central organs; its toxic dose is six times greater than that of physostigmine. Used in 1% solution made by adding one drop dilute sulphuric acid for every 0·1 gm. eseridine, which solution keeps unchanged for long periods.—*Rdsch.*, 1888, 841.

Ferrous solutions.—The reduction of oxidized and discolored ferrous solutions can be accomplished by freezing the solutions. Languepin observed that a 30% ferrous sulphate solution which had become strongly colored and deposited a red-brown precipitate, after freezing and subsequent liquefaction, reassumed its original green color, the precipitate also partially disappearing. The solution had also lost considerably its tendency to oxidize.—(*Arch. de Pharm.*) *Rdsch.*, 1888, 844.

Solution of Bromides.—Dr. Erlenmayer recommends: Potassium and sodium bromide of each 4 gm., ammonium bromide 2 gm., water of ammonia 1 drop, carbonated mineral water 600 gm.—*Pharm. Ztg.*, 1888, 644.

Hydrargyrum phenylicum or *carbolicum* used as a syphylitic specific is prepared as follows: Potassium phenol is first made by taking 94

parts crystallized carbolic acid and 56 parts potassium hydrate, dissolving in 90 per cent. alcohol evaporating to syrupy consistence on a water-bath and drying over H_2SO_4. Of this 100 parts are dissolved in alcohol, the solution filtered and precipitated with an alcoholic solution of 112 parts corrosive sublimate; the orange precipitate is well washed with 60 per cent. alcohol until only a faint turbidity with $AgNO_3$ results, then it is washed with strong alcohol until the washings contain no mercury (indicated by H_2S). Dried over H_2SO_4 the preparation is an amorphous brick-red powder of faint phenol odor. It differs from the commercial article in giving the tests for phenol by extracting an acidulated solution with ether, dissolving the ethereal residue in water and adding Fe_2Cl_6 or bromine-water. The formula is $(C_6H_5O)_2Hg$ containing 51·81 per cent. Hg; found in the above 51·68 per cent.—Hugo Andres, *Pharm. Ztschr. f. Russl.*, 1888, 625.

The examination of potassium or sodium iodide, containing iodate, for nitrate can be made in the usual way, by use of $FeSO_4$ and H_2SO_4, after boiling 0·5 gm. of the sample with 1 gm. $CuSO_4$, 0·8 gm. Na_2SO_3 and 10 cc. water until all of the iodine is precipitated as cuprous iodide and filtering; the boiling generally requires about one minute. —C. Schwartz, *Pharm. Ztg.*, 1888, 612.

Lactucarium.—Kremel has found in various specimens an adulteration with bread crumbs. Lactucarium extracted with a mixture of 3 parts alcohol and one part chloroform should yield from 55 to 60 per cent. extract (chiefly lactucon). The percentage of moisture and ash is also affected by an addition of bread crumbs. No. 1, was a pure specimen; 2 and 3 were adulterated, starch could be detected in these by the microscope as well as the iodine test in an aqueous decoction.

	Moisture.	Ash	Chloroform-Alcohol Extract.
1	5·80 per cent.	6·50 per cent.	57·46 per cent.
2	5·88 "	4·51 "	40·00 "
3	10·84 "	1.61 "	11·54 "

—*Pharm. Centralhalle*, 1888, 512.

Mercuric Salicylate.—The re-actions of this compound, solubility in solutions of NaOH and NaCl, are not gotten with the product obtained by the precipitation of $HgCl_2$ with sodium salicylate; the formula for this salt is $(C_7H_5O_3)_2Hg$. The process, if modified, so as to precipitate first the mercuric oxide from 271 parts, $HgCl_2$ with Na OH, washing, transferring to a vessel, covering with water, adding 138 parts salicylic acid and warming for a few hours with frequent stirring until the yellow color of the oxide is changed to the white

color of mercuric salicylate, will yield a product which should be entirely soluble in NaOH; should this not be the case an additional quantity of salicylic acid should be added. The precipitate is washed and dried at a moderate temperature; it possesses the formula $C_6H_4CO{\cdot}O{>}^{O}$ Hg.—J. J. Kranzfeld, *Pharm. Ztschr. f. Russl.*, 1888. 641.

Alcohol adulterations of volatile oils can be detected and estimated by agitating the oils with twice their volume of glycerin of sp. gr. 1·215 (contains about 20 per cent. water which prevents the glycerin from dissolving a portion of the volatile oil) in a graduated tube or cylinder for 5 minutes and allowing to stand until the mixture separates into two layers; the increase of the glycerin layer is due to the alcohol. If the tare of the cylinder be taken and the oil and glycerin weighed, the oil after separating can be removed by a pipette (the last drops are best absorbed by a piece of filter paper) the increase in weight of the glycerin is directly due to the alcohol present in the oil.—H. Hager, *Pharm. Ztg.* 1888, 650.

Safranin, a new reagent for glucose. The procedure in testing urine is to take 1 cc. urine, 5 cc. safranin solution (1 : 1000), 2 cc. solution of soda and heat to the boiling point; if decolorization takes place the urine is abnormal. From a number of experiments the author comes to the conclusion that all normal urine contains small quantities of carbo-hydrates, but the amount is not sufficient to decolorize the above quantity of safranin solution. Uric acid, kreatin, chloral, chloroform, hydrogen peroxide, and hydroxylamin salts, which reduce Fehling's solution, will not decolorize this test solution. Albumen, however, decolorizes it completely, but *very slowly*.

The solution keeps indefinitely, and is also of service in the detection of sugar (in foods, etc.), and glucosides after boiling with mineral acids.—L. Crismer, *Pharm. Ztg.*, 1888, 651.

Disinfectant soap for surgeon's use, proposed by Reverdin, is made from oil of sweet almonds, 72, solution of potash, 12, solution of soda, 24, sulphocarbolate of zinc, 2, rose water, 10. Mix the oils with the alkalies, add the zinc salt dissolved in the rose water, and keep at 20° for several days; pour into moulds. Contains an excess of fat.—*Pharm. Ztg.*, 1888, 660.

Cod-liver oil.—The rancidity of the oil does not depend upon the presence of free fatty acids, as in the case of butter, but is due to other

causes, possibly to heat and exposure to air. Oil extracted from fresh livers contained from 0·3 to 0·4 per cent. free acid (calculated as oleic acid), made from livers seven days old 0·9 per cent. acid. If air be slowly drawn through fresh oil heated on a water-bath during the first half hour there is a slight loss of acidity; if continued longer a slight increase of acids results (to 0·7 per cent. in 5½ hours). Rancidity was noticeable in all samples heated for more than 30 minutes, but the increase of acid being so slight it is impossible that this is the cause; fatty acids were liberated from a specimen of fresh oil, and these added to the oil in smaller and larger quantities, but in no case did it give the peculiar odor and taste of the rancid oil. Cod-liver oil carefully stoppered is not prone to change; specimens from 1884, 1885, 1886, 1887, showed respectively 0·37, 0·38, 0·36, 0·36 per cent. free acid. The cruder oils for medicinal and technical uses gotten through fermentation of the livers contain from 3·79 to 28 per cent. free acid, and still were free from rancidity. Fermentation produces the excessive acidity of the cruder oils. The acidity of oils obtained from the livers of various species varies decidedly:

Gadus virens, 0·17 per cent.; Brosmius brosme, 0·08 per cent.; Molva vulgaris, 4·36 per cent.; Raja radiata, 4·80 per cent.; Lamna cornubica, 2·62 per cent.—Heyerdahl, *Chem. Ztg.*, 1888, 1475.

Japan wax, examined by Eberhard, is composed chiefly of palmitin containing also small quantities of isobutyric and palmitic acids. The white coating which appears with age consists of palmitic acid.—*Rdsch.*, 1888, 844.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Terpin in Bronchitis.—This remedy seems to have been largely prescribed of late by Parisian physicians. Chéron's preparation has been most frequently used; it is given as follows in the *Monde Pharm.* of October 5th: Terpin, 5 gm.; glycerin, alcohol of 95 per cent., syrup of honey, of each, 70 gm.; vanillin, 0·02 gm. A tablespoonful contains 50 cgm. of terpin. Two tablespoonfuls are given daily to loosen and finally diminish expectoration. In the above doses it is not liable to cause gastric disturbance, especially if given after meals.

Mouth Wash.—The following wash for shrinking of the gums is given by various French journals of pharmacy: Tannic acid, 8 gm.;

tr. iodine, 5 gm.; iodide potass., 1 gm.; tr. myrrh, 5 gm.; rose-water, 200 gm.; mix. A teaspoonful in a third of a tumbler of water.

DENTITION SYRUP.—Paul Vigier proposes the following formula: Hydrochlorate of cocaine, 0·10 gm.; syrup, 10 gm.; tr. saffron, 10 drops; mix; to be rubbed upon the gums several times daily.—*Le Prog. Méd.*, Sept. 15, 1888. See also AM. JOUR. PHAR., 1886, p. 295.

ANALGESIC COTTON.—Under the name of "cocained and morphinated cotton" the following formula by Eller is given in the *Union Méd.*, Oct. 20, 1888: Solution of cocaine (3 per cent.), 30 gm.; morphine sulph., 0·8 gm.; absorbent cotton, 30 gm. Dissolve the morphine in the cocaine and soak the cotton in the solution. It may be made into a small ball and introduced into the cavity of an aching tooth, or, previously moistened, may be used in like manner for ear ache.

BONI'S BLISTERING LIQUID.—The formula is given in *L'Union Pharm.* as follows: Pulv. camphor, 20 parts; chloral, 30 parts; melt at 140° F., and add 10 parts pulv. cantharis; agitate for 1 hour, with heat, but do not let the temperature go above 158° F.; filter. This vesicant liquor may be used with compresses, or painted on with a brush.

APPLICATION FOR WARTS.—The following formula is given by the *Union Médicale*, Oct. 30th. Protochloride of mercury, 15 gm.; pulv. boric acid, 7·50 gm.; pulv. salicylic acid, 2·50 gm.; mix; apply three times, daily.

CHLORAL AMMONIUM.—According to *Nouv. Rem.*, Nov. 8, 1888, this substance is trichlor-amido-ethylic alcohol, having the formula $C_2HCl_3.NH_2.OH$, as stated by Nestbit in *L'Orosi*, Aug. 1888. It is obtained by passing a current of dry ammonia gas through anhydrous chloral dissolved in chloroform. A crystalline mass is produced which is removed and dried in vacuo. It resembles chloral in taste and odor, but the taste is less persistent. According to Nestbit, chloral ammonium used in 1 to 2 gm. doses gives the therapeutic effects of urethan and chloral, being both hypnotic and analgesic. Its action upon the heart and respiratory centres is less strong than that of chloral.

TO MARBLEIZE UTENSILS OF IRON OR BRASS.—M. Glibert's process is given in *Nouv. Rem.*, Nov. 8, as follows: Make a thin mixture of any desirable color of powdered enamel, in water, to which has been added a small quantity of glycerin, and apply with a brush. Then go over the work with a spray of oil of turpentine until spots appear and, when dry, bake in the usual manner.

TEST PAPERS FOR URINE.—As described to the *Soc. des. Sci. Méd. de Gannat*, these consist of small leaves of paper which, having been dipped into the proper solutions and dried, are bound into small books which may be carried in the pocket. The papers for albumin tests are made with ferrocyanide of potassium, tungstate of sodium, picric acid, potassio-mercuric iodide and citric acid; those for sugar consist of indigo carmine, carbonate of lime, etc. Litmus papers are included. With these, a test tube and a few "densimeters," the physician or pharmacist is able to make rapid tests. Twenty ccm. of the urine is placed in a tube and its reaction is ascertained. If alkaline one or two citric acid papers are added and the mixture clouds with albumin, mucin or the urates. With heat the urates re-dissolve, as also resinous substances (which are rarely present). Mucin is easily recognized by its characteristic appearance. One of the papers for albumin is then dipped into the solution and that substance is precipitated. To find sugar, 10 ccm. of pure water are placed in the tube with an indigo carmine paper, heating slightly. A soda paper and a drop of urine are added. The liquid is then heated for one minute and urine added, drop by drop, until the change takes place. The "densimeters" are the well-known specific-gravity beads which float or sink in accordance with the density of the solution. *L'Union Méd.*, Oct. 9, 1888.

TEST FOR ARSENIC.—To the suspected liquid is added, in a test tube, a solution of caustic potash or soda, and then a fragment of aluminium. The mouth of the tube is then closed with paper dipped in a solution of nitrate of silver. If arsenic be present the paper turns black. Aluminium is preferable to zinc, for the latter may contain arsenic, while aluminium is always free from it.—*Farm. Ital.; Arch. de Pharm.*, October 5, 1888.

BENZOIC ACID IN ALIMENTS.—Its use in beer and in foods of all kinds has been reported against by the *Comité d'Hygiène* on the ground that "substances having antiseptic qualities are injurious to the normal evolution of the digestive processes."—*Arch. de Phar.*, October 5, 1888.

PAVESI'S COSMETIC.—The formula for this solution—used for discolorations of the skin—is given in the *Monde Phar.*, Nov. 5, 1888, as follows: Borate of sodium, 10 gm.; glycerin, 20 gm.; rose-water, 150 gm.; alcoholic tincture of benzoin, 15 gm.; let the mass rest for several days and then filter. To be applied twice daily.

ACTION OF ALKALINE PHOSPHATES ON THE ALKALINE EARTHS AND OTHER OXIDES.[1]

By L. Ouvrard.

The oxide or a salt of the alkaline earth was dissolved in the fused phosphate, with or without an alkaline chloride, allowed to cool slowly, and the product treated with water.

Barium oxide dissolves readily in potassium metaphosphate or pyrophosphate, and in both cases yields the pyrophosphate $Ba_2P_2O_7$ in monoclinic prisms which dissolve readily in dilute acids and in concentrated sulphuric acid. In presence of potassium chloride, the result is the same if the proportion of the phosphate is not below 5 per cent., but with a lower proportion a chlorophosphate is formed. Precipitated barium phosphate behaves in the same manner as the oxide. Barium sulphate also dissolves and yields the pyrophosphate, the excess of sulphate crystallizing in the form of barytes.

Potassium orthophosphate with barium oxide, chloride, or phosphate, yields the compound $P_2O_5,2BaO,K_2O$ in transparent, dendritic crystals, soluble in dilute acids.

Sodium metaphosphate and pyrophosphate yield either barium pyrophosphate or, if the proportion of barium is considerable, the compound $P_2O_5,3BaO$, which crystallizes in large, transparent, lamellæ, seemingly belonging to the regular system; sp. gr. 4·1 at 16°. The crystals dissolve in dilute acids and in concentrated sulphuric acid. Sodium chloride promotes crystallization, but if the proportion exceeds a certain limit, a chlorophosphate is formed. Sodium orthophosphate yields only the compound $P_2O_5,3BaO$. Barium sulphate is not decomposed by the sodium phosphates; it dissolves to a certain extent but crystallizes unaltered on cooling.

Calcium oxide, phosphate, or sulphate with potassium metaphosphate or pyrophosphate, yield the compound P_2O_5,CaO,K_2O in large, transparent hexagonal lamellæ derived from the regular octahedron; sp. gr. 2·7. The same compound is also obtained from calcium chloride or fluoride if the alkaline phosphate is in sufficient excess; it dissolves readily in dilute acids. Tripotassium phosphate and calcium oxide form the compound $P_2O_5,2CaO,K_2O$, which has the same crystalline form as the corresponding barium salt, and has already been described by Grandeau, who obtained it by Debray's method. Sodium meta-

[1] *Compt. Rend.*, cvi., 1599 and 1729; reprinted from *Jour. Chem. Soc.*, October, p. 1033, 1035.

phosphate yields two products according to the proportion of oxide employed, namely, $9P_2O_5,10CaO,8Na_2O$, which was previously obtained by Wallroth, under the same conditions, and forms monoclinic lamellæ, and $P_2O_5,2CaO,Na_2O$, which has been described by Ditte, and forms transparent hexagonal rosettes. Sodium pyrophosphate and orthophosphate yield the salt $P_2O_5,2CaO,Na_2O$, and also the salt $2P_2O_5,3CaO,3Na_2O$, which crystallizes in slender, transparent monoclinic needles melting to a white enamel at a red heat. With the carbonate, phosphate, sulphate, chloride, and fluoride, the same products are obtained as with the oxide. With sodium or calcium chloride in excess, chlorophosphates corresponding to apatite and wagnerite are formed.

Strontium oxide and salts with potassium meta- or pyro-phosphate yield the compound P_2O_5,SrO,K_2O, identical in form with the corresponding calcium salt. Tripotassium phosphate produces the compound $P_2O_5,2SrO,K_2O$, identical in form with the analogous barium and calcium compounds. Sodium meta- and pyro-phosphates yield first the compound $P_2O_5,2SrO$ in small, rhombic prisms similar to those of the barium salt, and then the compound $P_2O_5,2SrO,Na_2O$ analogous to the product obtained with calcium. Sodium orthophosphate yields only the salt $P_2O_5,2SrO,Na_2O$; strontium sulphate is not decomposed by the sodium phosphates.

Barium is not readily displaced by alkalis, and therefore does not readily form double salts. Calcium forms double phosphates only, and strontium occupies an intermediate position.

Magnesium.—With potassium metaphosphate, the sole product is the compound $3P_2O_5,2MgO,K_2O$, which crystallizes in large, monoclinic prisms, very soluble in dilute acids; sp. gr. at $20° = 2·4$. It is analogous to the double magnesium sodium phosphate obtained by Fleitmann and Hennerberg in the wet way.

Potassium pyrophosphate or orthophosphate yields rhombic prisms of the salt $P_2O_5,2MgO,K_2O$, previously described by Grandeau. Magnesium phosphate yields the same products as the oxide, but the chloride yields a chlorophosphate unless the alkaline phosphate is present in considerable excess.

With sodium metaphosphate at a low temperature, the magnesium oxide not being in excess, the salt $9P_2O_5,10MeO,8Na_2O$ is obtained in highly macled, monoclinic prisms; sp. gr. at $20° = 2·7$. This compound has previously been described by Wallroth. At a high tem-

perature, the metaphosphate yields dendritic crystals of the compound $P_2O_5,MgO,2Na_2O$, and the same product is obtained with the pyrophosphate. It is readily soluble in dilute acids. Sodium orthophosphate yields the salt $2P_2O_5,3MgO,3Na_2O$ in dendritic crystals which depolarize light.

Zinc and cadmium yield compounds which are strictly analogous. With potassium metaphosphate, the salt P_2O_5,MO,K_2O is obtained in highly macled crystals which depolarize light and are soluble in dilute acids. Potassium pyro- or ortho-phosphate yields monoclinic prisms of the salt $P_2O_5,2MO,K_2O$, very soluble in dilute acids. Zinc and cadmium phosphates yield the same products as the oxides, and alkaline chlorides have no effect on the result even when present in large excess. The compound just described can, in fact, be obtained by the action of cadmium or zinc phosphate on potassium chloride.

Sodium metaphosphate yields the salt P_2O_5,MO,Na_2O, described by Wallroth, or the salt $P_2O_5,2MO,Na_2O$, described by Scheffer, or a third salt $P_2O_5,MO,2Na_2O$; according to the relative proportions of the oxides; sodium pyro- or ortho-phosphate yields the compounds $P_2O_5,MO,2Na_2O$ and $P_2O_5,2MO,Na_2O$.

Manganese yields products similar to those obtained with zinc and cadmium, but in presence of an alkaline chloride chlorophosphates are formed if the proportion of alkaline phosphate falls below a certain limit. P_2O_5,MnO,K_2O and $P_2O_5,2MnO,K_2O$ crystallize in monoclinic prisms; P_2O_5,MnO,Na_2O forms highly macled rose-colored prisms which are probably triclinic. $P_2O_5,MnO,2Na_2O$ and $P_2O_5,2MnO,Na_2O$ are isomorphous with the corresponding zinc and cadmium salts.

Cobalt and nickel form strictly analogous compounds. Potassium metaphosphate yields monoclinic prisms of the composition, $2P_2O_5$, $3MO,3K_2O$, and the pyro- and ortho-phosphate yield rhombic crystals of the salt $P_2O_5,2MO,K_2O$, all soluble in dilute acids. The presence of potassium chloride promotes crystallization, but exerts no other influence on the result.

Sodium metaphosphate yields the salt $9P_2O_5,10MO,8Na_2O$ in macled, dichroic violet or rose-colored prisms, or, if the oxide is in excess, the salt $P_2O_5,2MO_3,Na_2O$, which is isomorphous with the corresponding zinc salt; sodium pyro- or ortho-phosphate yields products strictly analogous to those obtained with zinc, cadmium, and manganese. In presence of sodium chloride, all the double phosphates of nickel or cobalt are converted into the salt $P_2O_5,2MO,Na_2O$.

THE PHYSIOLOGICAL ACTION OF BORNEOL.[1]

By Ralph Stockmann.

This paper is an account of a very complete investigation of the pharmacology of three substances, viz. "Borneo Camphor," "Ngai Camphor," and a body prepared artificially from oil of turpentine. These are identical in chemical composition, and possess the formula $C_{10}H_{18}O$; they differ, however, in their action on polarized light. For comparison the pharmacology of ordinary laurel camphor ($C_{10}H_{16}O$) and menthol ($C_{10}H_{20}O$) was also investigated. The result shows a general similarity of action in the different members of this "camphor group," agreeing in all essential points with our previous knowledge of camphor, but by placing that knowledge on an experimental basis, Dr. Stockmann's researches may do something towards increasing the usefulness of a drug possessing valuable therapeutic properties, but which is apt to be looked upon as obsolete for any active purpose.

Frogs, rabbits, guinea-pigs, cats and dogs were all poisoned by the drugs, the symptoms being those of a gradually deepening paralysis, affecting brain first, then medulla, spinal cord, and finally the motor nerves. In mammalia the encephalon was chiefly involved, convulsions, resembling epilepsy, being produced (most typically in cats) by doses of two to three grams. Smaller doses caused symptoms similar to those of alcoholic intoxication. No convulsions were produced after removal of the cerebral cortex in rabbits.

On the heart of the frog.—Williams's apparatus being used, the frequency of the heart beats was diminished, but their amplitude greatly increased, the blood pressure being also markedly increased, as well shown in some excellent heart-tracings which accompany the paper. Large doses killed the heart rapidly in diastole.

In mammalia no constant results could be obtained on the pulse or blood pressure.

The *vessels* were greatly dilated by solutions containing borneol—one cornu of a sheep's uterus being used and maintained at the temperature of the body.

Respiration was slowed from the first.

Muscles were unaffected by all ordinary doses.

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[1] *Journal of Physiology*, August, 1888; reprinted from *Medical Chronicle*, November, p. 145.

The *white corpuscles* of the blood were not increased in number by borneol. Binz has shown that most essential oils have the power of increasing the white corpuscles.

Glycosuria occurred in cases of poisoning by borneol, in which convulsions were a marked feature.

On temperature no constant result was obtained.

From his experiments Dr. Stockmann concludes:—

(1) That the camphor group is closely allied to the alcohol group in physiological action—menthol approaching it most nearly; as the number of H atoms diminishes in the different camphors we get an increased tendency to produce convulsions of cerebral origin.

(2) That pharmacological investigation confirms the value of these drugs in cases of increased spinal excitability.

(3) As cardiac stimulants they are closely allied to alcohol, but, in addition, they directly dilate the peripheral vessels—an action which Kobert has shown not to be produced by ethyl alcohol.

(4) Borneol is less irritating locally than common laurel camphor, and could be given in much larger doses without causing untoward cerebral symptoms.

PROPERTIES AND USES OF SOZOIODOL.

By Leopold Larmuth.

This substance, which was introduced by the firm H. Tromsdorff, of Erfurt, as a substitute for iodoform, is chemically an iodated phenyl sulphonic acid, more exactly diiodoparaphenolsulphonic acid. It is prepared in the following manner: By the action of concentrated sulphuric acid on phenol, one of the H atoms of the benzol ring is replaced by the group SO_3H. The body $C_6H_4<\begin{matrix}OH\\SO_3H\end{matrix}$ being obtained, the potassium salt of this acid is prepared, dissolved in water, and treated with iodine chloride. By this means two hydrogen atoms of the benzol ring are replaced by iodine, and the potassium salt of the iodated acid separates out $C_6H_2{=}\begin{matrix}OH\\I_2\\SO_3K\end{matrix}$; it is purified by repeated crystallization from water and dried. It occurs in the form of regular, well-formed, colorless and odorless crystals, which are slightly soluble in cold water, 1·8 parts being dissolved in 100 parts of water at 17°C.: it is

much more soluble in warm water, and slightly soluble in glycerin and alcohol. From this body sozoiodolic acid and all the other salts are prepared. The free acid crystallizes from water in the form of needle-shaped prisms; it is freely soluble in water, alcohol, and glycerin. With regard to the position of the iodine atoms, Herr Ostermeyer, the discoverer of the body, considers that they are in close proximity to the hydroxyl group. Various salts have been prepared; the chief which have, however, been therapeutically investigated, are those of sodium, potassium, zinc, and mercury. The sodium salt is much more soluble than that of potassium; it contains two molecules of water, and is soluble in cold water and glycerin to the extent of 6 per cent. The zinc salt is somewhat more soluble. The mercury salt occurs in the form of a fine yellow powder; it is almost insoluble in water, but pretty freely soluble in sodium chloride solution. Besides these compounds, salts of aluminium, magnesium, lead, barium, silver, and ammonium have been prepared. Sozoiodolic acid and its salts are effective antiseptics. Langgaard[1] states that an admixture of from 0·5 to 1 per cent. to gelatine cultivations restrained the development of streptococcus pyogenes aureus. The free acid being more powerful than the salts, an addition of 2 per cent. completely restrained the development of the organisms; upon bacteria of putrefaction and moulds the action is not so powerful. Therapeutically, sozoiodolic acid and its salts have been used chiefly in cutaneous diseases and in affections of the nose and pharynx. In the former Dr. Oscar Lassar reports most successful use of the drug, both pure and with admixture, as dusting powder, and in the form of paste, with zinc, starch, vaselin, and lanolin. He states that it is of most decided service in eczema, herpes squamosum, herpes tonsurans, and impetigo. He has also used it in ulcers and simple wounds with most gratifying success. He states that a 10 per cent. paste is most successful in the treatment of mycoses. As a dressing for sores sozoiodol with talc is most valuable, in many respects competing with salicylic acid, and unlike that substance, not causing artificial inflammation when applied in a concentrated state. The use of sozolodol in affections of the nose and pharynx is reported on by Dr. M. A. Fritsche.[2] He has had most satisfactory results in the use of the drug in cartarrh, in which the secretion has a tendency to thicken and dry, *e. g.*, laryngitis sicca, rhinopharyngitis,

[1] *Therap. Monatsh.*, 9, 1888, p. 433.
[2] *Therap. Monatsh.*, 6, 1888.

hypertrophic rhinitis, etc.; the inflammation of the mucous membrane diminished, and the character of the discharge was much improved. In ozœna the mercury and zinc salts were used alternately daily, with much beneficial result, a momentary active secretion being caused, followed by a complete disappearance of the fœtor. In tubular ulcers of the larynx improvement was noted; in syphilitic affections of the mouth and nose the mercury salt afforded most substantial service, gummatous affections of the velum and tongue being completely cured by insufflation of mercury sozoiodol combined with slight internal mercurial treatment. Internally the salts have been experimentally used by Langgaard,[1] who found that on rabbits the sodium salt had no toxic effect in doses of 1 gm. (15 grs.); it was also found that the iodine was excreted as an organic compound by the urine; it may be here mentioned that Cohn[2] could not find any potassium iodide in the lacrymal secretion during the administration of sozoiodol compounds. Langgaard concludes that the bodies may, so far as their iodine is concerned, be considered as non-poisonous, in distinction to iodoform and iodol.

Bufalini (*Ann. de Chim. e di Farmac.*, 1888, May, p. 308) has administered the drug to a considerable number of cases of phthisis. He observed little alteration, though the dose was as much as 1·5 grm. per diem, and certainly no toxic symptoms.

I have been using sozoiodol compounds for some time, and have to report most favorably on the results obtained; especially in rhinopharyngitis and rhinitis is this the case; the surfaces clean under the influence of the drug, and show a decided tendency to heal. In chronic purulent otitis the drugs have rendered very good service both in solutions and in insufflations; in ozœna, too, I can entirely confirm the observation of Dr. Fritsche.

With respect to the doses of the several salts, the sodium compound is used pure, or dissolved in water 3 to 10 per cent.: gauze and wool impregnated with this salt are now prepared, and are most convenient for wound dressings. If a prolonged action is wanted, the less soluble potassium salt is used, either pure or mixed with talc or milk sugar, five to ten per cent.; as ointments, all the salts are used made up with lanolin as base in the strength of five to ten per cent.; as pastes

[1] Langgaard, *op. cit.*

[2] Ueber die Wirkung des Calomel bei gleichzeitiger Anwendung einiger substituirten Jodpräparate. *Inaugural diss.*, Berlin, 1888.

they may be used in like concentration with zinc, starch, and lanolin or vaselin basis. For insufflations the sodium and potassium salts are used undiluted; the zinc with milk sugar, ten per cent.; the mercury salt, five to ten per cent. with milk sugar.—*The Medical Chronicle*, October, 1888.

CHEMISTRY OF BUCHU LEAVES.[1]

By Y. Shimoyama.

Flückiger obtained from the oil of buchu leaves a peculiar compound, described under the name of diosphenol; it forms colorless crystals belonging to the monoclinic system, which can be obtained several centimetres long by sublimation. It is easily soluble in alcohol, less so in ether, and scarcely at all in water. Its solutions are neutral. Diosphenol dissolves in concentrated sulphuric acid; on saturating the solution with barium carbonate and evaporating the filtrate, a little amorphous barium salt is obtained. According to Spica, diosphenol is an oxycamphor of the composition $C_{10}H_{16}O_2$; the author's results confirm this. *Methyldiosphenol*, obtained by the action of potassium hydroxide and methyl iodide on diosphenol, is a colorless liquid, which boils at 232–235°, and has a sp. gr. of 0·985 at 15°. It is easily soluble in alcohol and ether, but not in water. Its composition is $C_{10}H_{15}O_2Me$. The corresponding *ethyl*-compound is also a colorless liquid insoluble in water, easily soluble in alcohol and ether, of sp. gr. 0.967 at 15°. Boiling point 270–272°. *Acetyldiosphenol* is obtained by mixing diosphenol with anhydrous sodium acetate and excess of acetic anhydride, and heating at 145° in a closed tube. The rectified product is a colorless, odorless liquid, which boils at 269–270°, although not without decomposition. Sp. gr. 1·032 at 20°; easily soluble in alcohol and ether, but not in water. The compound is neutral, but after rectification has an acid reaction.

Long digestion of diosphenol with alcoholic potash partly converts it into *diolic acid;* this is separated from the liquid residue in the retort by the addition of hydrochloric acid dissolved in ammonium carbonate, treated with animal charcoal, and precipitated with acid. Diolic acid forms white, crystalline needles; its aqueous solution has an acid reaction; it neutralizes strong bases and liberates carbonic anhy-

[1] *Arch. Pharm.* [3], xxvi., 403–417; reprinted from *Jour. Chem. Soc.*, Nov., p. 1205.

dride from carbonates. It melts at 96–97°, volatilizes slowly on the water-bath, and decomposes when heated strongly, evolving a menthol-like odor. It is soluble in 122·7 parts of water at 18°, and 82 parts at 100°; easily soluble in alcohol, ether, chloroform, benzene and carbon bisulphide. Its composition is $C_{10}H_{18}O_3+H_2O$. The barium salt, $(C_{10}H_{17}O_3)_2Ba + 5H_2O$, is soluble in 67·89 parts water at 17·5° and 19·7 parts at 100°, and also in alcohol. Over sulphuric acid it gradually loses its water of crystallization. The white, amorphous silver salt, $C_{10}H_{17}O_3Ag$, rapidly blackens on exposure to the light. It is scarcely soluble in water even at 100°. The sodium and ammonium salts are amorphous. The calcium and magnesium salts are white, amorphous powders, insoluble in water, whilst the strontium salt is easily soluble. The copper salt is light-brown, the iron salt red-brown; both are only slightly soluble in water. Diosphenol, when fused with potassium hydroxide yielded an acid agreeing in every particular with diolic acid, but melting at 86°, that is 10° lower; attempts to raise the melting point of the new acid by recrystallization were unsuccessful.

Reduction of diosphenol in alcoholic solution by means of sodium amalgam gave an oily substance, which was dissolved in aqueous ether and treated with sodium to reduce the diosphenol still remaining unacted on. The solution was then allowed to evaporate, when an oily liquid permeated with crystals was left. The crystals, prismatic in form, melt at 159°, are odorless, sparingly soluble in alcohol and ether, and the alcoholic solution does not give the dirty-green coloration with ferric chloride solution which diosphenol does. Its composition is $C_{10}H_{18}O_3$, and must be considered as the *diol alcohol*. The oily compound occurring with these crystals is probably $C_{10}H_{18}O$, the principal component of buchu oil, according to Flückiger, and described by Spica under the name of diosmeleoptene. Diosphenol dissolved in carbon bisulphide and treated with bromine gives fine yellow crystals of the composition $C_{10}H_{14}Br_2O_2$; these melt at 43°, and are soluble in alcohol and ether, but not in water.

Grindelia robusta in chronic bronchitis.—Dr. Paul has obtained good results from extract. grindeliæ robustæ fluid. in chronic bronchitis, both the idiopathic form and in that complicated with asthmatic attacks, in doses of 45 to 60 minims daily.—*Deut. med. Woch.*, 1888, No. 6.

KAURI GUM INDUSTRY.

By Ralph Robinson.

It was a fine summer morning in March when our little party of two ladies and one gentleman set off on a trip to the west coast of the North Island. There being no railway or other conveyance to Karè Karè we had to do what others do under similar circumstances, namely, walk or ride (we preferred the former) the greatest portion of the way, carrying with us some provisions, tin cans for boiling and cooking, tin pannikins and plates, a few other articles and as few clothes as possible, the whole fastened up lightly in rugs or blankets and slung on the shoulders knapsack fashion. Having gone as far as we could by rail we alighted, and after adjusting our swags, as this kind of luggage is usually called, we commenced our journey over the lofty ranges separating the east coast from the west. The first two miles was through cleared and partly cultivated lands, apples and other fruits growing to great perfection on this clayey soil. Then a mile or so of ti-tree scrub, *Leptospermum scoparium* (Captain Cook's tea tree), bearing a large quantity of rosaceous white blossoms, even when only a few inches high. It grows quickly and attains a height of twenty feet or more, and is principally used as fuel. Here and there may be seen a settler's wooden house, comfortable enough in summer, but misery in wet weather; fortunately there is no snow so far north, and no frost to speak of. On reaching the bush proper (primeval forest) a scene presents itself which gives the impression of even nature having gone wild. An undergrowth of almost impenetrable thickness, interlaced here and there with the supplejack ropes, *Rhipogonum scandens* (Maori name—Kariao), the root of which is not very unlike sarsaparilla, and is sometimes substituted for it by herbalists. Then there is the *Corynocarpus lævigata* (Maori name—Karaka), with its glossy green leaves and yellow berries; the seeds are an irritant poison, producing convulsions and contortions of the limbs. When any of the Maori children had eaten any of these seeds, their parents used frequently to cure them by administering emetics and burying them up to the neck in earth, to prevent contortions. After being steeped in water several weeks the seeds form a portion of the Maori diet. We also noticed several tall specimens of *Dacrydium cupressinum* (Maori name—Rimu), with its fern-like foliage. The tree yields an astringent gum, and the bark is used by the natives as a styptic. In many

cases the trees are encircled to the very top with the *Metrosideros robusta* (Maori name—Rata). In several cases the tree had succumbed and decayed, leaving a large hollow shell of interlaced rata. Here and there was left a noble kauri, the *Dammara australis*, one of which measured upward of 32 feet in circumference. The largest known specimen in the colony measures about 72 feet in circumference, reaches a height of 80 feet without a single branch, and is estimated to have taken about two thousand years to grow.

There were many other trees in an advanced state of decay, covered with parasites, which gave them a very weird appearance. Hillsides covered with tree ferns, *Cyathœa medullaris* (Maori name—Punga), hundreds or perhaps even thousands standing close together, with here and there a nikau palm with its pinkish flowers or red berries attached to the base of the leaves. The umbrella and scented ferns were also in abundance. The first half of our journey being completed at a place known as Big Muddy Creek, but on this occasion a small stream of very clear water, we halted and soon had a supply of hot tea and a fair supply of solids as lunch. The other half of the journey was very like the first half, until we reached the west coast with its rocks and boiling surf as far as the eye could see. It is common here on such excursions either to sleep out in the open air or to make use of an uninhabited gumdigger's hut, or disused wharè, not always the most desirable abode, as in many cases you are brought in contact with too many bed-fellows in the shape of fleas. But Karè Karè has its idle saw mill and workmen's empty huts, in one of which we took up our abode. The furniture consisted of a rough kind of table, a form, and one or two boxes. Our beds were made on the floor of the wiry climber, *Lygodium articulatum* (Maori name—Mangèmangè), a few ti-tree twigs and rugs. Our cooking utensils were of the simplest description, tin cans (billies) and a few preserved meat tins playing a very important part. It was here we met with a camp of gumdiggers and had the opportunity of gaining most of the little information here given relative to the Kauri gum industry. They go out in parties of three or more, carrying with them their spades, spears, and bags, or they may have left their spades in the bush the night before. They usually went to their work between seven and eight o'clock in the morning, returning again about four o'clock in the afternoon, bringing with them what gum they had got. Friday was usually clearing up day, that is, they sorted and scraped their gum and bartered it in re-

turn for stores to the caretaker of the sawmill, drawing the balance in cash or cheque before going to town. The storekeeper in his turn sold it to the gum merchant.

There are two kinds of gum fields, the summer and the winter. It is usual to work on the ridges, that is, the higher ground, during the winter months, because then the rain softens the hard clayey ground and makes the labor much lighter; but in summer, when the ridges become too hard and the low-lying swamps sufficiently dry, they transfer their operations to them. The gum is found much nearer the surface on the ranges than in the swamps, being only a few inches below the surface, and sometimes even projecting above, whilst in the swamps it may be found to a depth of several feet, the soil of the higher ground having been washed away with the heavy rains and deposited in the swamps, burying the gum deeper each successive year. The spear is a sharp pointed steel rod with a wooden handle, and this is thrust down into the earth to ascertain if gum is present. If gum is proved to be present, then digging commences and the whole spot dug over until they suppose they have got all the gum out. It usually occurs in very irregular, rough pieces, about the size of a hen's egg, looking like a piece of very rough clay. This, when the outside is scraped off with a pocket-knife, is the Kauri gum usually met with in commerce, and worth about 35*s*. per cwt. on the spot. The smaller pieces are only washed and dried and do not bring nearly such a good price. As a rule the scrapings are not saved, not being worth more than 20*s*. for a large sackful. They are used for lighting fires and making fire lighters. The gum fusing and burning soon sets the sticks and logs on fire, the gum giving off a white smoke and aromatic smell. Sometimes very large pieces, a cwt. or more, of transparent and almost colorless gum are found near the decayed root of a tree, probably the gum of the original tree. This brings a very much higher price, and is used for making personal ornaments. It is easily worked with a knife into any shape, and polished with a soft rag and kerosine oil. At times large masses of the gum may be found exuding from the living tree, but this gum is not so good for varnish-making as the fossil gum. Three or four thousand men are usually engaged in digging and can earn in districts where the gum is fairly plentiful 30*s*. to 40*s*. a week, and, as the cost of living is very small, they could easily save money; but, being cut off from all civilization whilst at work, they speedily spend and waste all their savings when they go to town.

The gum is also found in considerable quantities, but of dark color, in the coal deposits, showing the antiquity of the Kauri forests. There were 4920 tons of gum exported from Auckland in 1886, the value of which was £257,653, being at the rate of rather less than £2 12*s.* 0*d.* per cwt. The gum was dearer then than now, and there is the cost of packing, sorting, warehousing, carriage from the gum fields, and other expenses to be added to the first cost. The Kauri gum industry is confined to the North Island, as it is only in the north that the Kauri pine grows; thus the unemployed of Auckland are not so badly off as those in the south, always having the gum fields to fall back upon as a last resource; a last one on account of the hardships to be gone through, especially when there is a wife and family, and because an inexperienced digger may be a long time before he finds gum enough to find him with food. A very large portion of the Kauri forest having passsd into the hands of a syndicate, it is very probable the gum digging will be regulated, and in all likelihood the price of the gum will advance. AUCKLAND, New Zealand.—*Phar. Jour. and Trans.*, Oct. 20, 1886, p. 306.

MARGOSA OIL.

BY C. J. H. WARDEN,

Chemical Examiner to the Bengal Government.

Margosa oil is the oil extracted from the almonds of the *Melia Azadirachta*, natural order Meliaceæ, a tree common in India, and known under the name of "Nim." The bark, leaves, fruit, and oil are held in high esteem by native and many European practitioners as remedial agents of value, a tincture and a decoction of the bark and a poultice of the fresh leaves being officinal in the Pharmacopœia of India. Preparations of the bark are considered effectual as antiperiodics, chiefly in the milder forms of periodical fever, and as tonics in convalescence after febrile and inflammatory affections.[1] The poultice of "nim" leaves is a common domestic remedy with natives, and is used as a stimulant application to indolent and ill-conditioned ulcers. The oil is used as an external application in rheumatism and as an anthelmintic, and is reported by Dr. A. Hunter to be an insecticide.[2]

[1] Appendix to Pharmacopœia of India.

[2] *Ibid.*

Margosa bark was examined by Cornish in 1857,[1] who isolated an alkaloid, which he described under the name of "margosin." The later researches of Broughton,[2] however, indicate that Cornish's bitter alkaloid is probably an amorphous resin. From the bitter oil of the seeds Cornish extracted an acid which he termed "margosic acid," but which he doubted to be capable of affording crystallizable salts.[3] Lepine,[4] who examined the oil, found it to have a specific gravity of ·921, and he describes it as possessing a bitter taste and a garlic-like odor, to congeal at + 7° C., and to yield by saponification 35 per cent. of fatty acids, melting at 30° C., and 65 per cent., melting at 44° C. Subsequent writers on Indian materia medica have quoted Lepine's results, but as far as I am aware no additions to Lepine's results have been published.

The margosa oil used in the investigation described in this communication was obtained by expression in my laboratory; there can therefore be no doubt regarding the genuineness of the sample. The fruit was washed to separate pulp, the stones dried, cracked, and the almonds exposed to a gentle heat for some time to remove moisture. The dried almonds were then crushed, placed in a cloth bag, and the oil expressed. It was found very necessary to first dry the almonds before subjecting them to pressure; without adopting this precaution a white creamy fluid was obtained, instead of clear oil, from which it was subsequently impossible to separate the oil, except by ether or other solvent.

The oil thus obtained was filtered through filter paper before it was examined. Directly after filtration the oil, when viewed in bulk, had a slight greenish coloration by transmitted light, owing to some of the almonds not having been quite ripe, and to solution of traces of chlorophyll in the oil. Viewed in a thin stratum the color of the oil was yellowish. The oil possessed a powerful garlic-like odor, and was very bitter. The specific gravity at 15·5° C. was 9235; at about 10°–7° C. the oil congeals, without losing its transparency. After standing for about thirty-six hours the recently expressed oil deposited a white sediment, which examined microscopically was found to be amorphous.

[1] 'Indian Annals of Medical Science,' iv.; AMERICAN JOURNAL PHARMACY, 1858, p. 126.

[2] *Pharm. Journ.*, June 14, 1873.

[3] 'Pharmacographia.'

[4] Gmelin's 'Handbook of Chemistry,' vol. xvii., p. 94.

The color reactions of margosa oil were not characteristic. With concentrated sulphuric acid a rich brown color was yielded, and a strong garlic odor evolved. By Massie's test with nitric acid the oil became almost immediately of a reddish color; after standing about one hour and thirty minutes the color was pale yellow. The elaidin reaction conducted according to Pontet's directions yielded a solid firm yellowish product after eighteen hours, the temperature in the laboratory varying between 89° and 93° F. Exposed in a thin layer on a glass plate to a temperature of 100° C. for some days the oil did not dry or become tacky. The oil was easily soluble in ether, chloroform, carbon bisulphide, benzol, etc. Absolute alcohol agitated with it was colored greenish; on separating the alcohol, and evaporating off the spirit, an extract was obtained which consisted of oil, from which a small residue, whitish in color, separated on standing. The alcoholic extract was very bitter, and possessed in a marked degree the peculiar odor of the oil. The whitish residue deposited from the oil, separated by alcohol and examined microscopically, did not appear crystalline. Margosa oil after repeated agitation with alcohol was found to have lost its bitterness and almost wholly its alliaceous odor.

A known weight of the oil was saponified with alcoholic potash, the alcohol completely evaporated off, and the soap dissolved in water. On agitating the aqueous solution of the soap with ether, 1·60 per cent. of ether extract was obtained of an orange-yellow color and bitter. This extract treated with 60 per cent. alcohol, left a small amount of white residue, which had the character of a wax. The aqueous solution of the soap, after separation of the ether, was heated for some time to remove dissolved ether, the solution was then mixed with dilute sulphuric acid in excess, and the insoluble separated from the soluble fatty acids in the manner recommended by Allen.[1] The soluble fatty acids amounted to 3·519 per cent., the insoluble to 89·128 per cent. The volatile acids consisted of butyric and a trace of valeric acid. During the distillation to separate the fluid from the volatile fatty acids, a small amount of a snow white fatty acid passed over; this acid had a melting point of 43·6° C., which corresponds with the fusing point of lauric acid. A weighed portion of the insoluble fatty acids, from which the lauric acid had not been separated, was dissolved in alcohol, and titrated with normal standard soda, using phenolphthalein as an indicator, ·288 gram of the acids required

[1] 'Commercial Organic Analysis.'

1 cc. of caustic soda for neutralization. No attempt at separating the fixed fatty acids was made; they probably consisted of a mixture of stearic and oleic acids, with a small amount of lauric acid.

Examined by Reichert's distillation process, 2·5 grams of the oil gave a distillate which after separation of the lauric acid, which had distilled over, required 4·6 cc. of decinormal soda for neutralization, phenolphthalein being used as an indicator.

The saponification equivalent of the oil was determined by Koettstorfer's method, and was equal to 284, the percentage of caustic potash required to saponify the oil being 19·72.

A preliminary examination of the oil having indicated the presence of sulphur, a quantitative estimation of the amount present was made and found equal to ·427 per cent. The oil after repeated agitation with alcohol was found to contain only ·109 per cent. of sulphur.

The extract obtained by agitating the oil with absolute alcohol has already been referred to; it was examined in the following manner:— The oily extract was treated with 60 per cent. spirit, allowed to stand, and the clear yellow alcoholic solution decanted from the insoluble oil; the alcoholic solution thus obtained was evaporated to dryness, mixed with ammonia, and agitated with ether. The ether solution was marked A. The aqueous solution, after separation of the ether, was mixed with dilute hydrochloric acid, and again agitated with ether. The ether separated of a yellow color, and below it some flocks of a dirty yellow hue, which refused to dissolve after prolonged agitation. The ether solution was marked B. From the aqueous solution the insoluble flocks were separated by filtration and marked C. The filtrate was not further examined.

Examination of ether solution A.—The solution was agitated with dilute hydrochloric acid, to remove any principles of an alkaloidal nature. The ether was then separated and evaporated; the resulting extract was pale amber in color, viscid at first, very bitter, and had a marked odor of the oil. It contained sulphur. It was easily soluble in 60 per cent. alcohol, ether, chloroform, etc., but insoluble in acids, or in caustic alkaline solutions. It had the properties of a neutral resin.

The hydrochloric acid solution was of a yellow color; it was mixed with ammonia, which occasioned a white precipitate, and agitated with ether. The ethereal solution on evaporation left a yellow residue, not readily soluble in dilute acids. The dilute sulphuric acid

solution was bitter, and yielded a precipitate with alkaline carbonates and hydrates, phosphomolybdic, and picric acids, potassio-mercuric iodide, chloride of gold and perchloride of platinum. This principle had therefore the properties of an alkaloid.

Ether solution B.—On evaporating the ether solution B, a dark reddish bitter extract was obtained, soluble in alkaline solutions, and re-precipitated in yellowish flocks by dilute acids. It had the properties of an acid resin.

Precipitate C.—The precipitate was well washed, and dissolved in alcohol; on evaporation a brittle darkish residue was obtained, soluble in alkaline solutions, reprecipitated in yellowish flocks by acids, soluble with very great difficulty in ether, easily soluble in chloroform. This principle thus also had the properties of an acid resin.

In addition to the principles above described as being present in the oil, an examination of the cake left after expression of the oil, indicated the presence of another neutral principle, insoluble in ether or alkaline solutions, but dissolving in chloroform.

Medical College, Calcutta.

—*Phar. Jour. and Trans.*, October 27, 1888, p. 325.

HYDRASTINE AND DERIVATIVES.[1]

By E. Schmidt and F. Wilhelm.

Hydrastine. By Wilhelm.—The extract obtained by treating the coarsely powdered root of *Hydrastis canadensis* with water acidified with acetic acid at 100°, is evaporated to a syrup and excess of dilute sulphuric acid added, when berberine sulphate separates. The filtrate neutralized with ammonia gives a precipitate containing much hydrastine; this is separated, and on adding ammonia in excess to the filtrate a further precipitate is produced, which contains *canadine.* Both precipitates, boiled with ethyl acetate, give solutions which on cooling deposit hydrastine in large crystals, somewhat colored, but rendered pure by recrystallization. The crystals from the second ammonia precipitate are much purer than those from the first; by slow evaporation of the ethyl acetate solution they can be obtained as large as walnuts.

[1] *Arch. Phar.* [3], xxvi., 329–365; reprinted from *Jour. Chem. Soc.*, Nov., p. 1212.

Hydrastine picrate $C_{21}H_{21}NO_6C_6H_2(NO_2)_3{\cdot}OH+4H_2O$, is thrown down as an amorphous, yellow precipitate, which is deposited from its boiling alcoholic solution in splendid yellow needles. By the action of ethyl iodide on hydrastine under pressure, a well crystallized ethiodide,

$$C_{21}H_{21}NO_6EtI,$$

can be obtained of the form $\infty P.\ \infty P\infty .\breve{P}^{\infty}.(P.\breve{P}^{\infty},)$ melting at 205° 206°. The corresponding chloride could only be obtained in a gummy mass; its solution was therefore precipitated with platinum and gold chlorides respectively, and the corresponding double salts were obtained and analyzed. Both are amorphous, the platinochloride being light red, melting at 207°, and having the composition

$$(C_{21}H_{21}NO_6,EtCl)_2PtCl_4,$$

and the aurochloride being yellow, melting at about 110°, and having the composition $C_{21}H_{21}NO_6EtCl,AuCl_3$. *Hydrastine-ethylammonium hydroxide,* obtained by exactly precipitating the iodine from hydrastine ethiodide by means of silver oxide, concentrating the filtrate, and allowing to remain over sulphuric acid, appears as compact, slightly colored crystals, which are purified by recrystallization from hot water. Their composition is $C_{21}H_{21}NO_6Et{\cdot}OH$, showing that the hydrastine has the character of a tertiary base, and does not, as Power supposed, belong to the imido-bases. The attempts to obtain a hydro-compound by the action of nascent hydrogen on hydrastine, both in acid and alkaline solution were unsuccessful. The evidence as to the existence of a third alkaloid, canadine, was doubtful.

Action of Oxidizing Agents on Hydrastine. By E. Schmidt and F. Wilhelm.—Hydrastine, when treated with manganese dioxide and sulphuric acid, yields *opianic acid* and *hydrastinine.* Oxidation with platinic chloride gives the same products. Potassium permanganate in alkaline solution produces *hemipinic* and *nicotinic acids*; in acid solution opianic acid is produced, as one of the authors had ascertained when Freund and Will's publication of the same fact first appeared. The base formed simultaneously was not isolated, but by employing barium permanganate hydrastinine in small quantity was obtained along with opianic acid. Chromic acid yielded the same two products.

Comparing *narcotine* and *hydrastine,* E. Schmidt considers that the former contains three methoxyl-groups, thus: $C_{19}H_{14}(OMe)_3NO_4$, whilst the latter contains only two, thus: $C_{19}H_{15}(OMe)_2NO_4$. Since

the oxidation of narcotine with manganese dioxide and sulphuric acid yields opianic acid and cotarnine, and under the same conditions hydrastinine gives opianic acid and hydrastinine; further, as opianic acid contains two methoxyl-groups, and cotarnine contains one of these groups, as shown by Wright, it follows that hydrastinine contains no methoxyl-group, and cotarnine may prove to be a methylated hydrastinine. The author hopes later to succeed in converting hydrastine into narcotine.

MINUTES OF THE PHARMACEUTICAL MEETING.

Philadelphia, Nov., 20th, 1888.

The meeting was called to order, Mr. Wm. B. Webb having been called to preside. On motion, the reading of the minutes of the last meeting was omitted. The secretary stated last month that a gift of some valuable works had been made to the library from the collection of the late Professor E. S. Wayne, of Cincinnati; at the time he was not aware that to the widow of the late professor a proper acknowledgement had already been made. The registrar stated that he had received a communication from Mr. A. L. Beck, of Sharon, Pa., a graduate of our college, of the year 1887; upon motion it was read. It is entitled "Chemistry in a Drug Store."

"For the encouragement and benefit of the students, and especially to the juniors, who have more time ahead of them, would I impress the importance of improving the opportunities offered by the laboratories. I am aware that the few notes I have to offer would not interest that class of students who only study just enough of each branch to "pull through" at examination time. They would not care to *waste* time or money on chemical apparatus or in the laboratory; while there are others that do not really appreciate the advantages of a thorough laboratory course, and think that one day a week, for a period, in handling reagents is sufficient for the present, and that they will do more in that line in the future; but as far as I have seen, they never do. I have been informed by traveling drug-men that very few druggists, including graduates in pharmacy, have a set of reagents or volumetric apparatus, or make any pretensions whatever to examine the drugs they buy. The only way I can account for this state of things, is, that having little or no experience in qualitative or quantitative analysis they have not enough confidence in themselves to undertake even easy determinations when they should have interest enough to lead them in that direction.

"Being located in an iron town of eight thousand inhabitants, of course the most profitable work for an analyst comes from the furnaces and mills, not all of which employ their own chemist. Aside from this the more frequent calls I have had, after making known I was prepared to do analytical work, have been in urinary analysis. I supplemented the excellent course in microscopy under Prof. Brown, by a special course in urinary histology at the

Jefferson Medical College under Prof. Rivley. These with Prof. Trimble's lectures to the class on urinary analysis, left nothing to be desired, and were well worth the time and money spent. The simple apparatus Prof. Trimble used for the estimation of urea is an illustration of how we learn by seeing or doing what we probably would overlook, or not attempt if left to find ourselves, or work out from the books. Urinary examination does not require much time and pays well. I never charge physicians more than half-price, and sometimes make no charge.

"Recently, after making a complete analysis of a mineral water found in Franklin, Pa., while I had my apparatus and reagents in order for the determination of organic impurities by Wanklyn's method, I concluded to offer to the School Board and citizens to determine the amount of chlorine (which I did volumetrically) and "free and albuminoid ammonia" for $1.50 for each well, during the following week. I was surprized to get over twenty applications in the time stated. People will pay that amount to know what kind of water they use, who will not pay $5 or $6. Having everything in good working order I was able to complete duplicate analyses in about one hour and a-half, or easily do four a day and attend to other duties. The cost of materials was little and the experiment paid well for the time required. The Wanklyn method is not difficult, in fact easy, after having once gone through it under instruction; but it would be discouraging and uncertain to most persons who would attempt it even from the explicit directions of the author. Therefore one or two days in the laboratory under instructions would be more satisfactory than a week or more working it out for yourself. In fact this statement applies to the pharmaceutical and microscopical laboratories as well as to the chemical work-shop.

"I wish to mention the way I overcome the tendency of the flasks to crack during the distillation of the water. I place a piece of wire gauze about one-eighth inch below the flask, so that they do not touch, and have had no trouble since.

"Of course, a chemist is consulted on subjects as varied as Nature herself. Farmer Smith's crops failed; he wants the soil examined, if it won't cost over fifty cents. Neighbor Jones thinks his whiskey is drugged, because it affects his bladder. Brown finds fool's gold in digging his well; Black's chickens were found dead one morning, and he brings their stomachs over to be 'analyzed.' The barber brings a new hone to be examined with the microscope, to see if there are any flaws or rough spots in it. All would be pleased to have your services if it costs little or nothing. These are all actual facts.

"Interspersed with these comes work that pays. I will note a few: One person paid $2 to know that a certain dough wall-paper cleaner was colored with red aniline. A confectioner some time ago brought me specimens of oils of lemon and peppermint, which he had bought for pure, and had paid a good price for. I put 10 cc. oil of peppermint in a graduated tube, and added 10 cc. of glycerin, shook thoroughly, and allowed to separate. The oil only occupied now 5 cc., while the alcohol it had been reduced with combined with the glycerin making 15 cc. The oil of lemon was 60 per cent.

It required about 15 minutes' time and a few cents' worth of glycerin. I charged only $1, but secured a new customer.

"An Oil City man had red earth in his garden, and wanted to know what it was, and if it would make paint. It cost him $10 to learn that most of the earth-paints were composed of ferric oxide or carbonate, such as his proved to be.

"Chemistry also pays in the store. A horse doctor here used considerable of a certain "spavin cure." I took a day to examine it, and now make it for him at a profit of $1.20 a pint, instead of 30 cents, as before. I also examined a popular catarrh cure that has given good satisfaction, and now make one that proves just as good. I will note here that in the examination of the two last articles, and similar preparations, the knowledge gained in plant analysis is of inestimable value. It suggests methods of separation and identity, and is well worth the time and study bestowed on it.

"Recently, after standardizing some spirit of nitrous ether by Allen's method, I examined five samples from different retail stores. Two of them contained less than four-tenths of one per cent. (0·4 per cent.) of ethyl nitrite, one contained 1·2 per cent., one 2 per cent. and the best one 3·6 per cent. ethyl nitrite. In closing I will urge all who can, to get as much laboratory experience as possible, and they will never regret it. Aside from chemical analysis as a source of revenue, the ability to do such work secures the confidence of physicians in your capacity as a pharmacist, and elevates you above your competitors in the estimation of the public, making your microscope and analytical balance a better advertisement for your business than any other method known. Yours, etc.

A. L. Beck, Ph. G.

Sharon, Mercer County, Pa., November 16, 1888.

Mr. G. M. Beringer on behalf of Mr. Bullock, presented a piece of the tree which furnishes the Canada balsam (*Abies balsamea*, Miller); this specimen exhibited very plainly the vesicles which contain the balsam.

Dr. Lowe stated that he had learned that grocers were selling essence of ginger put in two-and-a-half-ounce bottles for twelve cents, and that a lady made use of two bottles without the slightest relief.

A paper upon *Commercial Bicarbonate of Sodium* by Mr. H. J. M. Schroeter, was read. Prof. Maisch inquired if American brands were free from alumina, as formerly some did contain it. Mr. Schroeter said that it was examined and found to be free from that and all other metallic impurities.

Prof. Trimble read a paper upon *Shepherdia argentea*, or Buffalo berry, which is used as a food supply by the Indians. In reply to an inquiry it was stated that the shrub could be grown, probably without difficulty, east of the Alleghenies. Mr. Beringer said the reading of the paper reminded him of the puff-ball (*Lycoperdon solitum*), or tuckahoe, which contains a large amount of pectin. Prof. Maisch said that in times of food scarcity it had been used as food, but it would not be very palatable.

Prof. Maisch read a paper from Mr. Greenawalt upon the use of the blue flower of *Iris versicolor* as a test for acids and alkalies. He also gave some results of the investigations thus far made upon the blue and red colors of

flowers, and stated that the changes occurring in botanical specimens on drying seemed to indicate that the blue colors of flowers were not alike. Mr. Beringer said, that some blue flowers faded readily on drying, while others became deep blue. Professor Trimble thought that one reason why chemists did so little work on the coloring matters of flowers was the extreme difficulty that attends the subject.

The meeting then adjourned.

T. S. WIEGAND,
Registrar.

EDITORIAL DEPARTMENT.

The next meeting of the American Pharmaceutical Association is to be held next year in San Francisco. Since the adjournment of the last meeting a number of members, who were not present at Detroit, have expressed their intention of going to the Pacific coast next year, and we think that, as far as numbers are concerned, the prospects are that as many members will undertake the journey of several thousand miles, as have usually been in attendance at the annual meetings from a distance of five hundred miles and over. An important point will be the decision upon the date, which among other things, has been entrusted to a committee from whom the following communication has been received, which will explain itself. We would urge upon all, who intend to go to the San Francisco meeting to promptly communicate with the chairman of the committee in compliance with his request, and in furtherance of the object:—

DEAR SIR.—The Committee on Arrangements for the next meeting of the American Pharmaceutical Association, which will be held in San Francisco, desire an expression of opinion from the members interested in the date of this meeting as to the most suitable time for holding it.

Serious objections have been offered to June, the time which at first seemed to be most favorable, mainly on account of it being a busy season in most of the large cities; some object on account of State association meetings. Our California friends say they prefer June, but that any time will suit them that will enable the largest number of Eastern members to visit them; the earlier the date the more pleasant the season to visit the Pacific Coast. September, the usual time of meeting, seems to be the most objectionable, and for various reasons, but principally on account of the opening of the schools and colleges, which would deter many of the members from going to California at this season.

From present indications Monday, July 15, appears to be the most favorable time.

If there are any objections to this date, members are requested to immediately communicate with the undersigned, and name the date they consider most favorable.

It may be here incidentally mentioned that the necessary cost of the trip to San Francisco for those East of the Mississipi, and to return home as they would from a meeting in the East, will probably not exceed $150, and for $200 each they can visit a number of places of interest contiguous to the route. A little more expense will be incurred if a visit to the Yosemite Valley is included.

This statement is made on the authority of a representative of different railroad lines.

EMLEN PAINTER,
Chairman Committee of Arrangements.

Broadway and 34th street, New York.

The California College of Pharmacy held its sixteenth annual commencement at Odd Fellows Hall, San Francisco, on the evening of November 20, when the President of the University of California, Horace Davis, conferred the degree of Graduate in Pharmacy upon the following:

Adolph G. Bussenius,	John F. A. Delicat,
Edward P. Driscoll,	Horatio B. Emerson,
George E. Flint,	David L. Henderson,
Charles C. Higgins,	Harry D. Kelsey,
James H. McCarthy,	James J. Molony,
Frank B. Petrie,	Philip J. Perkins,
Frank W. Ralston,	George A. Root,
William K Sanborn,	Ernest J. Thevenet,
William H. Topley,	Thomas J. White.

Addresses were delivered by Messrs. Horace Davis, F. H. Melvin, President of the California Pharmaceutical Society, F. W. Ralston and Prof. Runyon, the latter awarding also the prizes consisting of a gold medal to W. K. Sanborn; Encyclopœdia of Chemistry, to H. B. Emerson, and various scientific books to W. K. Sanborn. Mr. G. J. Harvey was the recipient of the junior prize, consisting of lecture tickets to the senior class.

Limitations of a Druggist's Right to Sell Liquors Without Paying Special Tax.—Our attention has been called to the *Internal Revenue Record*, May 21, 1888, containing the following decision in relation to the sale, by druggists, of alcoholic preparations:

Treasury Department,
Office of Internal Revenue,
Washington, May 11, 1888.

HON. HENRY W. BLAIR, U. S. N.,

Sir:—In reply to your verbal inquiry, I would say that under the provisions of Section 3246, R. S., amended, a druggist is permitted to keep spirits and wines, and use them in combination with drugs, in the preparation of medicines that are not beverages, and to sell such medicines, without paying special tax as a liquor dealer under the internal revenue laws of the United States. But, under the uniform rulings of this office, and the decisions of the United States Courts, he cannot, without subjecting himself to this special tax, sell spirits, or wines, that are not combined with drugs or materials of any kind taking these liquors out of the class of beverages, even when he sells the liquors on a physician's prescription and for medicinal use only. Besides the medicinal compounds which a druggist is authorized to sell without paying special tax as a liquor dealer, although they contain alcoholic liquors, there are other compounds, containing spirits, which, while they are not medicines, are non-potable articles which do not

come under the head of "distilled spirits, wines, or malt liquors," in contemplation of the internal revenue laws, and which therefore he is entitled to sell without paying special tax, *e. g.:* Toilet articles, such as cologne and bay rum; ether and alcohol for use in photography; benzin or ether, and alcohol, for cleaning purposes; castor oil and alcohol for toilet use; Florida water, violet water, etc., toilet articles made from alcohol; alcohol and camphor; alcohol and ammonia and whiting, a cleaning preparation; alcohol and shellac, for painters.

Wyeth's Malt Extract, which is held out as a medicine, has been represented, under oath, by the druggists who manufacture it, as containing the chemical principles diastase, dextrin, maltose, in such strength as would produce nausea, if it should be used as a beverage.

This and other like extracts of malt, held out as medicines and not as beverages, are to be regarded as medicines until the facts brought before this office by the collector show that they belong in the class of malt liquors (beverages) referred to in Section 3339, R. S. Meanwhile druggists who sell them in good faith as medicines only are not to be called upon to pay special tax as dealers in malt liquors on account of such sales.

As to the compounds called "bitters," and "tonics," etc., the rule is that, if they are composed of spirits in combination with drugs, herbs, roots, etc., and are held out as remedies for diseases stated in labels on the bottles, they are to be regarded as medicines until the facts ascertained as to the purpose for which they are usually sold and used show them to be beverages; and, until such facts are obtained, druggists and merchants who do sell these compounds in good faith as medicines only, are not required to pay special tax as retail liquor dealers on account of such sales.

Every person who sells them as beverages, either by the bottle or by the drink, or sells them knowingly to those who buy them for use as beverages, involves himself in liability to criminal prosecution under the internal revenue laws, unless he holds a special tax stamp as a liquor dealer covering such sales (U. S. v. Frederick Cota, 29 Int. Rev. Rec., 249; U. S. v. Stafford, 30 Int. Rev. Rec., 247; U. S. v. J. W. Bibb, 33, id., 391).

I send to you herewith at your request a copy of the Internal Revenue Record of January 17, 1887, containing this ruling, and also a copy of the Record of January 30, 1888, containing the decision of the Supreme Court of Maine on the question of the use of a United States special tax stamp, held by a person as a liquor dealer in a State, as evidence against him in a trial under the State's prohibitory law. Respectfully yours,

E. Henderson,
Acting Commissioner.

INDEX.

TO VOL. LX (VOL. XVIII, FOURTH SERIES), OF THE AMERICAN JOURNAL OF PHARMACY.

ERRATA.

Page 93, foot note, line 2, for 1885 read 1855.
110, line 12 from bottom, for American College read Maryland College.
242, line 20 from top, for hydrogen read Hg.
402, line 3 from top, for a solution read evolution.
403, line 10 from bottom, for carbonate read carbamate.
562, line 15 from top, for ardium read sodium.

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Vol. 60 AMERICAN No. 12

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

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Under the supervision of the Publishing Committee, consisting of

HENRY N. RITTENHOUSE, JAMES T. SHINN, CHARLES BULLOCK, T. S. WIEGAND,

AND THE EDITOR

JOHN M. MAISCH.

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CONTENTS.

NOTICE TO READERS.

This journal is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the advocation of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicines drugs and chemicals.

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Pennsylvania Pharmacy Board.

The next examination will be held in January, at Philadelphia. Applicants for examination should apply to the Secretary of the Board, H. B. Cochran, Lancaster, Pa., in December, for the proper blank form of application and the exact date and place of the meeting.

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Powd. Ext. Butternut	"	40	Powd. Ext. Mandrake	"	40
Powd. Ext. Calabar Bean	"	1 00	Powd. Ext. Mezereum	"	1 20
Powd. Ext. Cannabis Ind	"	75	Powd. Ext. Nux Vomica	"	60
Powd. Ext. Cascara Sagrada	"	50	Powd. Ext. Nux Vomica Aqueous	"	80
Powd. Ext. Chiretta	"	50	Powd. Ext. Opium	"	1 20
Powd. Ext. Chinchona Calis	"	1 00	Powd. Ext. Pleurisy Root	"	50
Powd. Ext. Coca	"	60	Powd. Ox-Gall	"	40
Powd. Ext. Colchicum Root, Acetic.	"	50	Powd. Ext. Poke Root	"	40
Powd. Ext. Colocynth	"	60	Powd. Ext. Pulsatilla	"	50
Powd. Ext. Colocynth Co	"	40	Powd. Ext. Quassia	"	50
Powd. Ext. Columbo	"	50	Powd. Ext. Rhatany	"	40
Powd. Ext. Conium Leaf	"	40	Powd. Ext. Rhubarb	"	50
Powd. Ext. Conium Seed	"	50	Powd. Ext. Rhus Toxicodendron	"	60
Powd. Ext. Cotton Root bk	"	40	Powd. Ext. Sarsaparilla Jam	"	75
Powd. Ext. Cubebs	"	1 00	Powd. Ext. Stillingia	"	50
Powd. Ext. Culver's Root	"	40	Powd. Ext. Stramonium Leaf	"	40
Powd. Ext. Damiana	"	60	Powd. Ext. Stramonium Seed	"	60
Powd. Ext. Dandelion	"	40	Powd. Ext. Uva Ursi	"	40
Powd. Ext. Digitalis	"	40	Powd. Ext. Valerian	"	40
Powd. Ext. Dog-grass	"	40	Powd. Ext. Wahoo	"	50
Powd. Ext. Ergot	"	60	Powd. Ext. Witch Hazel	"	40
Powd. Ext. Eucalyptus	"	40	Powd. Ext. Yellow Dock	"	40
Powd. Ext. Gentian	"	40	Powd. Ext. Yellow Jasmine	"	40

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